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BULLETIN NO. 12 OF

THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

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PROCEEDINGS AND PAPERS OF THE

SEVENTH ANNUAL MEETING

HELD AT

PITTSBURG, JANUARY 17 AND 18, 1906

F. D. BARNHART, President. W. F. HOLTZER, Secretary
M. P. SHOEMAKER, Vice Pres. GREENSBURG, PA.
D. B. FISHER, Treasurer R. F. D. No. 1

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PROCEEDINGS AND PAPERS

OF

SEVENTH ANNUAL MEETING

OF

THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

AND THE

PENNSYLVANIA DAIRY UNION

Heid at Pittsburg, January 17-18, 1906.

Officers of Breeders' Association:

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1906

ANNUAL MEETING

OF THE

Pennsylvania Dairy Union

HELD AT

MONONGAHELA HOUSE, PITTSBURG, PA.

January 17 and 18, 1906.

PREFACE

The report of the proceedings of the annual meeting of the Pennsylvania Dairy Union and the Pennsylvania Live Stock Breeders' Association, held at Pittsburg January 17 and 18, 1906, is presented on the following pages. A slight abridgment has been found necessary in some cases, to bring the cost of publication within our means, but it is pretty nearly complete. Delays by stenographer, printers and the undersigned which were in all cases unavoidable have prevented as prompt publication as was hoped for. The work has to be done at odd moments so far as the editing is concerned, and it has been done under great difficulties. If there are any omissions or errors this is responsible.

We call special attention to our advertisers and urge readers of this Bulletin to patronize them. Our thanks are due to the Secretary of Agriculture, Hon. N. B. Critchfield, for his continued support and encouragement. At his request the Dairy Union and the Live Stock Breeders' Association will meet next year at Harrisburg the same week the meeting of the Pennsylvania State Board of Agriculture is held. See announcement elsewhere.

E. S. BAYARD,
Secretary.

Meeting of the Pennsylvania Dairy Union, held at Monongahela House, Pittsburg, Pa., January 17, 1906.

Meeting called to order at 10:00 o'clock A. M., by President H. P. Armsby.

President Armsby: We will now listen to the report of the Treasurer, M. E. Reeder.

Mr. Reeder: I will state that the receipts from all sources during the past year have been $263.70, and the expenditures up to January 15th, the date of the report, $261.07, leaving a balance of $2.63. The bills and vouchers are in my hands ready to be submitted to any proper authority.

It was moved and seconded that the reports be accepted and referred to an auditing committee of three. Motion carried.

President Armsby: We will now listen to the report of the Board of Directors.

Mr. Norton: In our meeting last winter the matter was left with the Board of Directors to make arrangements with the Breeders' Association to have a joint meeting, and we decided on Pittsburg. Also in the matter of the committee appointed to meet with other committees appointed by the Grange and other kindred organizations of the state to go to Washington and fight the Oleomargarine bill. We were never called together. The bill was dropped in Congress soon after the committee was appointed.

There are some matters we should bring up here. As to the next meeting place, and whether we will meet with the Breeders' Association or have a separate meeting. Our secretary and myself attended the meeting of the Dairy Union of New York State. We had the assurance of all of the machinery and supply people that they would exhibit at our next meeting if we would secure a hall. That we were unable to do here. The New York State Union was given $5,000 to run their dairy union, but at the present time they are paying all expenses out of the exhibits and the money that is put up by the cities where they meet. I think we should have an exhibit. We must if we make the dairy union a success; we must go on the same line as they do in other states and have butter and cheese exhibits and also dairy implement exhibits, and the New York people even had a milk exhibit. They had everything that was connected with the line of dairying ,and I would suggest this; and I also suggest before we leave here that consideration should be given to the matter of dairy inspection. They are doing good inspection work in Michigan and Wisconsin. As our Legislature meets next winter, this matter ought to be taken up next session. We need the help of every dairyman in the state and every creamery man, they are all interested. In our secretary's report, he will

tell what he has done. We must have the help of everyone and secure legislation that will be to our interest as dairymen in this state. We are behind the other states. We are second in consumption of dairy products and certainly ought to demand that they be pure and good.

The President: You have heard the report of the Board of Directors embodying also certain suggestions for action which I take it will come up later, perhaps individually under the head of miscellaneous business. As the report itself is important, what action will you take upon the report of the Board of Directors? Shall it be accepted?

It was moved and seconded that the report of the Board of Directors be accepted. Motion carried.

The President: We will now listen to the report of the Secretary.

The Secretary: The Directors' report has covered the ground. I do not know it is necessary for me to say anything in regard to those matters other than the minutes which are covered by the proceedings which have been published and sent out. The committee on legislation has nad no meeting since the last meeting of the Dairy Union, and there is nothing to report.

The President: Has the delegation representing the Dairy Union in the allied agricultural organization any report?

No report .

The President: We will now listen to a paper entitled "City Milk Production," by the Manager of the McJunkin-Straight Dairy Company, Mr. E. M. Bailey.

Mr. Bailey: My paper is a little bit off on city milk production. It is written on the city milk supply. As these two are so closely allied, it will not make much difference.

CITY MILK SUPPLY

E. M. Bailey, Pittsburg.

There is no article of food which is so universally used from infancy to old age, and upon which so much dependence is placed by strong and weak alike, as pure milk. When we consider that it is the only food that will within itself sustain life for an indefinite period, and that in thousands of cases it is depended upon entirely to nurse the weak and suffering back to health and strength, we arrive at some idea of the importance of a pure milk supply for our cities.

Of late years a demand for a pure milk supply has developed among physicians, and those laymen who have given the matter the thought that it deserves, and, as is always the case where there is a well defined demand for an article, that demand is being satisfied to some extent along the lines of certified sanitary dairies and sanitary plants for the Paesteurization of milk.

Sanitary Milk.

The producers of certified milk follow the idea that milk that comes from a healthy cow and is handled in a sanitary manner, cannot be improved upon, and that this is true no one can doubt. Briefly, the method followed by the above mentioned producers is as follows: First, the careful selection of a herd of cows, usually grades of the different milk producing breeds, that will at any time stand the most rigid examination by competent veterinarians. This herd is housed in a barn so constructed and arranged that the ventilation is as nearly perfect as it is possible to make it. The floors, stalls, and feed boxes are all arranged for daily scrubbing and kept immaculately clean —in fact, in one dairy that I have seen, when they have city guests out to inspect the dairy the table is laid for luncheon on the feeding floor between the two rows of cows. The walls and ceilings of these barns are either whitewashed every month or are so finished as to admit of scrubbing down frequently. In this way such a degree of cleanliness is secured as we like to see in the dining rooms and kitchens of our homes. The cows are usually stable fed all the year, being allowed out a short time in fair weather for exercise, and some of the herds are pastured to some extent during the summer. They are brushed and carded daily; their sides and udders are wiped off with a damp cloth just before milking. The milkers are required to dress in perfectly clean white suits, and to wash their hands in an antiseptic solution before milking each cow. The first milk from each teat is drawn into a separate pail and not mixed with the certified milk, in order that the colonies of germs that have grown in the end of the milk duct may not get into the milk sold as certified. The milk is drawn into closed sterilized pails through absorbent cotton, and transported to the dairy house some distance from the barn. There it is immediately cooled to at least 45 degrees and filled into sterilized bottles, which are then capped and sealed ready for delivery to the customers at from 12 to 16 cents per quart. Better milk than this there cannot be, and there is a demand in every city of any size for a large quantity of this milk, even at these prices. But the customers must be assured that they are getting what they are paying for, that is, absolutely pure, clean milk of a fair richness.

Commercial Milk.

The great mass of city dwellers, however, cannot or will not pay such prices as this for milk, and yet they demand a milk that shall be pure and clean, of reasonably good quality, free from drugs or preservatives of any kind, and yet keep sweet from 24 to 36 hours after delivery. Fortunately for this class of people, Louis Pasteur, in his researches to help the wine makers of France, opened the way to what is now called the pasteurization of milk. This process, stripped of all technical terms, simply means the heating of milk to a temperature of from 158 to 160 degrees Fahrenheit, and the subsequent cooling down to 45 degrees or lower. This treatment destroys the germs which produce lactic acid, which sours the milk, and at the same time any pathogenic or disease producing germs which the milk may contain if the cow was not perfectly healthy, or if any external contamination may have taken place while the milk was handled from cow to consumer. Briefly, the milk for pasteurization must be produced from cows that to all physical appearance are healthy, kept in barns that are whitewashed at least once

a year, better twice, all floors and gutters kept clean and sweet, the cows brushed and carded as carefully as you do your horse, their sides and udders wiped off with a damp cloth just before milking. They must be fed on clean, sweet foods, but never just before milking on account of the dust stirred up and which carries millions of germs ready to drop into the milking pails. The milk should be drawn by milkers with clean hands and clothes, and as soon as milked carried into a milk room with a closed door between it and the stable proper. It should then be strained through at least 4 ply of cheese cloth, then cooled down by use of a Star or Champion type cooler to 60 degrees at the highest, better 50 if you have cold enough water, and finally put into clean cans and sent to the nearest shipping station with as little delay as possible.

At the Shipping Station.

The shipping stations are usually maintained by the city dealer who buys this milk and as soon as the milk is received at the station it should be inspected by a competent judge for any foreign flavors, dirt, or anything else that might be detrimental to the production of fresh, sweet milk, and if found satisfactory, weighed in, run through the pasteurizing machines and filled into sterilized cans and shipped to the city, usually in refrigerator cars. Here the milk is again inspected by a man whose sense of smell has been trained by long use to detect the slightest taint that might in any way be detrimental to the purpose for which the milk is intended. After passing this inspection the milk is cooled down to a temperature of 35 or 40 degrees, and stored in large vats at a temperature near the freezing point. From these vats the milk is raised to the filter or clarifier which removes the last trace of any foreign substance which may have fallen into the milk while in course of transit. From these, the milk is taken to the pasteurizing machines where it for the second time goes through the process of pasteurization and from this it is filled into sterilized bottles, ready for delivery to the various customers in time for breakfast. It is absolutely necessary, through all these processes and handling, that cleanliness in all that work implies shall be observed, for in no place is the saying, "Eternal vigilance is the price of success," more true than it is in the milk business both in the producing and the handling.

Right here let me caution you against the use of common soap of any kind in washing your dairy utensils, owing to the fact that the odor of soap as well as the caustic it contains is well nigh impossible to get rid of, and anything with such an affinity for a stray odor as milk has, will be spoiled by the soapy odor very quickly.

The idea that pasteurization will make good milk out of bad milk seems to have some adherents, but this is a very great mistake; however, when used in connection with reasonable care in the producing and handling of milk, it furnishes a milk that compares favorably with the best handled certified milk at a cost to the consumer of half the cost of certified milk, that is, from 6 to 8 cents per quart.

Old Methods of Handling Milk.

In contrast with the above methods let us see how the bulk of milk for the cities was formerly handled. In fact there are still great quantities of it being sold daily. Cows, any old thing that will give milk, no difference whether they give enough milk to pay for the feed they eat or not. Milked in a stable that is cleaned only when the dairyman can find nothing else to do. Cows never curried, manure sticking to their sides and flanks until they resemble the knight of old in his coat of mail. The milking is done any time and often the milkers use wooden pails, or worse still, tin pails that have felt the effect of Brindle's hoof so often they scarce look like pails. Milk dumped into cans not too clean without straining, or if strained at all only through a wire strainer, cooled by setting the cans in tank of water only because he knows the dealer will reject it if it is not fairly sweet when received in the city. In many cases this milk is dosed up with preservatives of some kind, though of late years this has gotten to be rather a dangerous proceeding, owing to the activity of our dairy and food departments enforcing the laws against adulteration. The milk is then taken to the train, shipped to the city to some dealer, who takes it to his sanitary (?) dairy in the basement of some dwelling or store or what may be worse, to the rear end of some store room, the balance of which serves as a living room for the family, here immersed in a tank of foul smelling ice water, allowed to stand until enough cream has risen to the top, then skimmed until it will barely pass the limit of fat required by the law, or if there is any assurance the inspector will not be in the neighborhood that day, the skimmer goes still deeper. It is then sold from a can, or churn as many call them, placed on the seat of the wagon beside the driver, measured in vessels that are coated with a film of dust from the city streets each time the wagon passes from one customer to the next. Or perhaps this milk is wholesaled to the corner grocer who stores it in his store along with onions, potatoes, cheese and various other flavor producing articles, to be sold to his customers at cost in order to draw trade.

Think of it, will you? This milk first flavored with the odor of a dirty stable, and a passing examination will disclose that it contains more than the odor, then with that of a dirty ice tank, than which nothing smells worse, then skimmed and doctored until a self-respecting cow would be ashamed to own it, then flavored with all the various flavors of a grocery store, and then this abortion of pure milk sold to draw trade; rather one would think it would drive it away. And yet there are hundreds and thousands of poor people who have never tasted the nice, sweet, clean flavor of pure milk, and who think this is all right. They don't realize that it would be better to use half the quantity of pure, wholesome milk ,that they would get more nutrition for their money. They don't realize it is feeding such stuff as this that causes such a large infant mortality, and if you, the producers of milk ,could see the poor little half-starved speciments of humanity that city dwellers see on the streets in the poorer sections of the city, you would register a vow right now that you would not only insist upon the production of clean, pure, wholesome milk, but you would see that the dealer handled your product in a cleanly, sanitary, honest manner or you would find one who did. Upon you to a certain extent lies the blame for the state of affairs which now exists, for these people do not know what pure

milk is, you do, and just as long as this class of dealers can buy milk, these poor unknowing people are going to use it.

The Remedy With Producers.

Now let us see what can be done to remedy this. First, you producers of milk for city consumption, try to impress on your minds the vital importance of what you are doing to some consumers of your product. Never handle a pail of milk without remembering that this milk may be the means through which health and strength may be regained by some sufferer if you handle their food as you know you should . Then know your dealer and know that he handles your product as he should do. Then hound your lawmakers until they will give the Dairy and Food Department money enough to inspect the sanitary end of the milk supply as well as the adulterations. While I do not for a minute believe that any chemical adulteration is necessary, but that it should be followed up as closely as it is being done, or closer if possible, and offenders punished, yet I do believe that more sickness and deaths are caused by milk handled in dirty cans in disease-ridden dairies and milk depots and in filth generally, ten times over, than were ever caused by chemical preservatives used in milk. An investigation of recorded epidemics of typhoid fever alone that have been traced to the milk supply will convince anyone of the crying need for action in this direction.

This being the case, why is it not time something was done in this direction? More frequent examinations of the milk supply of our cities and villages are necessary. Examinations bacteriologically, microscopically and chemically of the milk sold by every distributor should be made monthly. If these examinations show the milk from certain distributors is not being handled properly, a thorough inspection of the city plant or depot of this dealer will determine if he is at fault or not. If he is at fault, proceed as is deemed best by the Department to make this dealer remedy his methods, or if his methods are found right then examine the milk from the different sources from which he secures his supply in the same way and when the trouble is located notify the dealer and hold him responsible, as it is within his power to either have the trouble remedied, or to refuse to buy the milk from the producer who is at fault. This followed up conscientiously, and it can be done without the expense being burdensome, all milk required to be pasteurized and all deliveries made in glass bottles that have been thoroughly cleansed and sterilized before filling, and the day of epidemics caused by an impure milk supply will be a thing of the past.

Discussion.

Dr. Barclay: The first time that I prepared a paper on the subject of milk, its production and uses, and read it, I was very much discouraged by many of my friends on account of the subject being a new one. I read that paper at Louisville, Kentucky, before the Misisssippi Valley Association about twelve or fourteen years ago. In that paper I made some statements which were pretty broad and still somewhat startling. One of the statements was that over 40 per cent of all dairy cattle in and about the city of Pittsburg were tuberculous, and afterwards many persons who seemed to know something about it thought I had very much overdrawn the percentage of tuberculous cattle, but after investigation it was found that I had not quite told the whole truth. It seems to me with all the efforts that have been put forth, and with all that has been said and done by honest dairymen, at least in the city of Pittsburg, we are further away from pure milk than we have ever been. I believe that the milk that is sold in Pittsburg to-day is further from the standard than it has ever been before. We have a large number of places in Pittsburg that I have denominated milk factories. Now, I suspect that perhaps there is very little, if any, milk sold from those which is fit to be used. It would require more time than I feel like occupying in giving the reasons for that conclusion, but I am certain if that milk is tested that it will be found to be about what I denominate "commercial milk," that is, just to evade the law, and the greater part of it I believe would not pass the requirements of the law. Two years ago while in New York and Newark, N. J., I had an opportunity to study the subject of milk. The milk that is produced in New York is very good, very much better than it is in Pittsburg. Another place, not a city, although it is sometimes called a city, I visited some years ago and at once took up the study of milk there and the milk in that place, Asheville, N. C., was the best that I have ever found anywhere. The milk produced on the Vanderbilt farm was over and above anything I have ever found. I suspect the milk in New York is better than that supplied to the consumer anywhere in the United States except in Ashville. The milk in Chicago is very good. And now, gentlemen, in my judgment, there is only one way to bring that matter to what it should be ,that is by efficient laws, and their enforcement. I do not believe that any amount of talk or any amount of moralizing that we can do will ever bring the production of milk to what it should be. It seems to me that there is such a large temptation to be dishonest. Now ,not very long ago, I was lauding a friend who has a small dairy up in Indiana county. I said I believed that he was an honest man. I was thinking of him and recommended the products of his dairy to a man who wished to buy milk. He said, "That is true. I want to tell you I bought several cans of cream from him. I appreciate all you say, but you have never studied that man carefully. Last summer in the hot season I received from him a number of cans of cream, and it keeps well. Why, I kept that for two weeks. It was perfectly sweet, and when I tried to churn it, it ran all over the place. I dipped out until finally I gave it up, there was no butter in it. If there was, I was not able to get it." Now that man is an elder in the Presbyterian church, and I had the impression that he was a perfectly honest, honorable man, and that was a backset, but that is only one of a very large number. It is a difficult thing to find a man who will not be tricky and play you false in the production of milk. Now, I am sorry to say that, but it is true, I know what I am talking about and if anybody objects I can give the facts.

Now, the laws of this state are as nothing; we all know that we have had a number of laws, but the laws that we have had have not been enforced. The pure food laws of course are being enforced, but it is a very easy matter to pay the fine and go on and poison people. I heard the gentleman referring to sterilizing of all vessels, and that point is well taken. As far as I know, the only means for the preservation of milk beyond the time it will naturally keep before it sours is cold. Now, then, the scientific application of cold to milk after it is drawn to relieve it of the animal heat and then keep it at a proper temperature is the only proper means for the preservation of milk in order to produce it fit to be used by the human being.

Dairy Inspection.

Mr. Wells: I would like to say a word to emphasize the points brought out in the papers, of the necessity of dairy inspection. By dairy inspection, I mean inspection of the animals, the cows that produce the milk, and the premises, the stables, and surroundings and also the methods of handling the milk. I am satisfied that we will never arrive at any great degree of perfection until some means or some laws are passed to effect this, personal inspection by a person who is authorized to look to this matter. Pasteurization does a great deal, but I look upon that simply as I do upon the water supply. If we can get water that is pure from the fount of Heaven, it is much preferable to putrid water that has been filtered and made fit for use. I do not think we realize, many of us, the conditions that prevail. It was brought to my attention very forcibly not very far from this city. There was a contract made to supply butter for the United States navy, and it was in part under the supervision of the Department of Agriculture, and I was sent to the district to see what the facilities were for producing this butter and the fulfillment of the contract, which had been already been made. I spent a half a day, with a team and a man driving around and looking at and visiting as many of the various dairies as I could find. It was, I think, some time in April. I did not find a dairy barn that any gentleman in this house would say was fit to keep cows in. In that inspection I did not find one that had a window in it or any proper means of ventilation. The third barn I visited was a large building, one side was arranged for stalls for the cows, occupying two-thirds of the space, and the other third was a pig pen filled with hogs. In talking with the creamery man about it, he said they were in the habit of leaving a night's milk setting on the barn floor where it got the fumes of this hog pen. About noon we reached the Secretary's premises. I thought to myself, "Here we will find a barn as it should be." We took dinner there and while the teams were being unhitched, I took the opportunity to go down into the stable. It was noon, and a bright day, and when I got in it, I could not see ten feet from me. I suppose there was one door about wide enough to let a cow in, but no window. It seemed surprising that such conditions prevail, but I know from personal experience they exist in certain localities. We are doing good work in many states in this line by personal inspection. Even if there are no very severe penalties for unsanitary conditions, yet the fact that they are to be inspected from time to time and the reports go to the state has of itself a very beneficial effect.

Prof. Lane: We cannot say too much of cleaning up. It has been my hope the milk producer would have an opportunity to exhibit his production just as well as butter and cheese producers. You know such contests have never come about as far as I know. You have heard the Great National Dairy Show that is to take place in Chicago next month and here there seems to be an opportunity to bring this about, to have a test for the milk and cream producers as well as butter and cheese producers. It has been the custom for a number of years for dairymen's associations to offer prizes for the butter scoring the highest number of points, or cheese, but it seems to me there is all the more reason why the milk producer should have an opportunity to show his products and should enter in a contest for prizes or medals.

Mr. Wilson: I will ask the doctor if he would recommend pasteurization of good, sanitary raw milk.

Dr. Barclay: No, sir. I think it is a mistake. I believe that it never should be done. I think it has so changed the physical condition of the milk that new products are formed there which are very injurious.

Mr. Reichert: One of the questions that confronts the average farmer who is trying to run this business is, "How can I get recognition for my milk for the efforts I display?" We put forth efforts to do our work conscientiously and sell the milk so that it would be within the reach of the average person. That is selling at six or eight cents a quart. Any man knows that any one who is producing a pure, sweet milk and a clean wholesome article, and sells it for six or eight cents, has a pretty good job. There are hundreds of dairymen in Pennsylvania who are conscientious in their efforts, who cannot get recognition simply because there is no law, there is no anything, to help us get the recognition we ought to get for an honest article. The dairymen here are going to do something in the shape of asking the legislature to give us some kind of a law that will enable those of us who are not prepared to spend thousands of dollars in advertising to have our article recorded and recognized simply for what it is, and I believe before we pass the resolution during the day asking for a law there ought to be some kind of discussion as to what we ask for. It would be a good thing to have Governor Hoard tell us what they are doing in Wisconsin. To me it looks as though a compulsory inspection law in itself would be violated and inadequate. But I believe that if I, as an ordinary dairyman, would know that the state inspector is going to inspect my dairy once a month, is going to test my milk, and give me a certificate that would be recognized by all people throughout the state, which would tell the conditions, and I did not know the time that inspector was coming, that such a persuasive law as that would do a great deal more good than a compulsory law. I offer that as a suggestion for you dairymen to think about.

Dr. Barclay: I would like to ask the gentleman if he believes conscience prevails in the production of milk.

Mr. Reichert: Well, I am an optimist. I have rubbed up against men for a long time, and while I know that some of us have pretty raw edges, yet it has been my faith, after rubbing up against the world for a good many years, that the great majority of men to-day mean to do right if there is half a chance, and I want to tell you that the world is to blame in the majority of cases if a man goes wrong, for the reason that they pooh-pooh the right, that they put just as good a brand on dishonesty

as they do on honesty, thus making it really an incentive for a man to be a little crooked rather than an inducement to do right. For instance, a conscientious dairyman who tries to give you five per cent milk, curries the cows every day and tries to have everything clean, makes all sorts of sacrifices, doesn't get a bit more encouragement than the fellow that has his cows covered with dung from their heels to their ears, that never washes himself, let alone his cans, and that gets in close proximity to the pump once in a while. The fellow that is taking in half water and half milk and half cow dung and half something else, gets just the same credit. I think it is the public that is crooked rather than the dairyman. (Applause.) Gentlemen, I believe that the hearts of the people are in the right place if they are given half a show or the least encouragement to do right. The dairymen along with the rest of the world will stand ready to do their part. (Applause.)

It was moved and seconded that the subject of dairy inspection be made a special order of business for the afternoon after the election of officers.

Motion duly seconded and carried.

President Armsby appointed Mr. J. H. Reichert, Mr. M. P. Shoemaker, and Mr. J. F. Lantz as an auditing committee. It was moved and seconded that the committee on resolutions be appointed to which all resolutions shall be referred for consideration and recommendation back to this meeting. Carried. Messrs. Shoemaker, Henry Palmer and E. M. Bailey were appointed as such committee .

President Armsby thereupon called Mr. Norton to the chair.

Mr. Norton: We will now listen to a paper entitled "What Dairymen Are Doing," by H. E. Van Norman, Professor of Dairying at Pennsylvania State College.

ADDRESS OF PROFESSOR H. E. VAN NORMAN

Gentlemen of the Pennsylvania Dairy Union: In coming to this state to take up this work, it was not because there was nothing to do where I have been, but because I believed there was something even larger to do here, and possibly greater facilities with which to do them, and that in the doing I might have a part. I want to call attention to some of the things as they are; then to make some suggestions as to how they may be changed if you want them different.

In the first place I find that Pennsylvania ranks second as a dairy state in the union in the value of her products, in the volume of her products both in butter and cheese; but she ranks fifth in the number of cows it takes to produce these products—a suggestion that you are getting better results from the cows you are keeping than some other states. I find that the average production of the cows of this state is only 150 pounds of butter per cow. I do not know yet what it costs to keep a cow in this state, but I imagine that it could not be very far from what it is in some of our other states. Therefore the statement of somewhere from $28 to $40 would take care of the average cow of this state. When we talk about average, you gentlemen do not represent the average dairymen of this state. You represent the cream of the dairymen, the men who know so well the difficulties of your work and that there is something to be learned that you are willing to lay down your tools and come and try to find out from your neighbors the better way. The average dairyman has not reached that state of development. How many of you are willing to admit you are only getting 150 pounds of butter per cow per year?

In my work I have to keep in mind not the creamery alone, but the great mass of the dairymen, and what can we do to help them as well as to help you. The average cow of this state, as I said, produces about 150 pounds of butter. At twenty cents a pound, it just about pays for the feeding. Yet investigations carried on in many states of the union (I have no figures to quote from this state yet) show that it is possible for every dollar's worth of feed to get from the cow from a dollar and half to two dollars worth of milk and buttter. Then if we are feeding our cows $40 worth of feed, we ought to get somewhere from $60 to $80 return, charging her for that feed at the price that the feed is worth at the time. Then I say if you can sell to the cow the feed at market price and get a return of from fifty cents to a dollar over and above the cost it is good business. Now, if you can produce the major portion of that feed and also have a profit, whatever profit there is in the production, then you have the two profits of the producer and the feeder. Perhaps some of you are located where you have to buy a great deal of feed; others possibly are located where you can grow a great deal of it. Each one must take those things into account and work them out to suit. The fact remains there are a lot of men keeping cows that do not pay. In order to bring this average down as low as 150 pounds there must be a lot who are keeping cows which do not produce that much, and when you come to a careful investigation of fifty or a hundred herds you will find men that are not getting eighty cents for the dollar's worth of feed; and as one man was asked how did he make his farm pay, what did he do to get the other 20 cents, said, "Well, we have to have something to eat up the feed." You see his aim was wrong. He was trying to get his feed eaten up instead of trying to get a profit. Most of us look at these things from a dollar and cents standpoint, not merely for the standpoint, but because we have to have money in our business, and in the discussion of these things I hope to keep in mind all the time the natural phase of the thing, because if we cannot make the thing add to our income either directly or indirectly, most of us cannot spend much time on it. Indeed it is only here and there a man is willing to put the quality of his product above everything else, whether it costs money or makes profit. Most of us have to have a little profit.

How to Advertise.

We oftentimes lose sight of the fact that superior quality in itself makes for a profit by increasing a demand for a good thing. It was suggested by the question that was asked, that many of us are not sufficiently good business men, good advertisers, to get our good products before the people that want it. I am firmly convinced that in every town of from 12,000 to 30,000 people, there

are more people who want a good article and who are willing to pay for a good article than the dairyman with 150 to 200 cows can supply, but it is not every man who can produce a good product that is a good enough advertiser to "get there." There may not be a bit of merit in some things that are advertised, but the advertising has made everybody know about them, and the selling of a thing is oftentimes in the advertising first and the quality second. We have got to get our good article before the people. You or I cannot perhaps get a new law right off, but we can go at advertising to-day. The question of making people know more about the quality of the thing we have got is before us. I leave that as one suggestion. I speak with a knowledge of the facts that men are doing it, that men are selling milk, good milk from clean cows kept in a clean way, at a price above the market because they have succeeded in making the public know that they got that, and then, as our optimistic friend said, they have that honesty and integrity which in itself is a guarantee that if the milk is this way to-day it will be so to-morrow. That is the first thing. The next thing is to make the public know you have got it.

We find a great many people who do not know that the whole success of keeping milk is keeping it clean, first keeping the dirt out, because along with the dirt is the cause of decomposition, and the next point is keeping it cold. That is the whole secret of milk. Pasteurization helps if you have not got both of these conditions. If you have both of these conditions, added to healthy cows, you have no need of pasteurization, for milk ordinarily should be consumed within two or three days. Good milk will keep that long if it is kept clean enough and cold enough, and "enough" is within the reach of commercial conditions. Dairymen are doing those things. Milk was sent to Paris during the exposition there that was sweet 18 to 21 days because it was sweet and clean and cold. We have had milk on our table at home seven days old which was perfectly sweet as far as any mortal could tell it. Of course there may have been some little change going on, but for all practical purposes that milk was sweet seven days old. It was from clean cows and a clean place and kept cold, by a man who was in the business, as he said, for fun, but he said the fun was all gone when the balance was on the other side of the ledger. He was not spending a fortune, he was trying to make something and to teach his boys to furnish milk of that kind, as the business had grown from two cows ten years ago to 200 cows last year. Why? Because the fact that this milk came from there was a guarantee that it was all right. I say dairymen are doing these things, they are furnishing this kind of milk here and there and they are not producing it at a loss, but now what we need is to show the great mass of dairymen some of those things, some of these methods, that are successful in making good milk and in making profitable milk, and how are we doing it? We are doing it by such associations as this. We are doing it in a number of other states in another line. I want to put the question to you, How far do you want to go in that line?

Instruction and Inspection.

In Illinois they are having five men connected with their station and stationed there and a considerable part of their time during the year is spent in lines of work that tend to bring these facts home to the producers of the state. For instance this question of the cow. They have one man who goes from farm to farm in a certain section within the limit of his time and ability and teaches those people how to study the question of economic production, how to sample their milk, how to weigh their milk, shows them a plan that is so simple and easy that they can do it, and we find as a result of that work that once a man's attention is called to it and he learns how easy and helpful it is, he keeps it up. Wisconsin has a number of men who are doing the same thing. Indiana has recently started in that same line, and we had, when I left there, something like a hundred cows just near the college that were under test, tests that were started and suggested by the college, and helped out in a way with funds which the dairy interests of the state have provided. Now, the point I want to make in connection with these suggestions is that we at the College, I am prepared to do all that I can to help you in your work in any line that we do the things you want done and provide the wherewithal to do it. Now, in taking charge of the dairy department there at the College, I am prepared to do all that I can to help you in your work in any line that our department can so far as you are ready to have that help and provide the means to give it. Whether it shall be in teaching the boys that you send there how to make butter, how to handle milk, how to inspect milk, how to make cheese—whether it shall be in carrying on tests, investigations or demonstrations and experiments, or field instruction among the creameries. In Indiana we have one man who gives his whole time in travelling from one creamery to another, spending a day or two there helping the butter maker to overcome the difficulties that he finds there. What is the justification for that? In three times inside of two weeks was he able, by a couple of hours' work in the creamery, to save that creamery man from one to three dollars a day. Who gets the benefit of that? It comes back to the patrons of the creamery, because it has reduced the expense of making that butter or cheese as the case may be. In this case it was butter. Now, dairymen are doing those things in other states, what do you dairymen want to do in this state? I am ready to help to work out the problems just as fast as the advantages will permit. Minnesota made a good showing at the World's Fair, because of the work she had done among her people. Wisconsin has done her work along the cheese line. Indiana and Illinois are doing their work among the manufacturers. Canada has over 30 men working along these lines. So much for what some of the conditions are, and what some of the things are that the dairymen are doing to support and help and overcome them. Dairymen of other states are carrying on, in connection with a meeting of this kind, a dairy exhibition. Why can't we in Pennsylvania have a big dairy meeting-show in which we shall have butter and cheese and possibly milk, for this is a great milk producing state for the retail market. Why can't we have a dairy machinery show in connection with it where the creamery men, the butter makers and farmers can come together and see the latest machinery? Those things are being done in other lines. One suggestion comes to the breeder as to what the dairymen are doing. I picked up a report the

other day and in the back I saw an ad like this: "We keep our cows for profit. Our cows averaged seventy-four dollars over and above the cost of feed for the last year. We have two bulls for sale from cows of this kind." I just thought, there is a breeder that is going so far ahead of the average that he ought to be advertised from one end of the country to the other. Now, when our breeders of dairy bred cattle will quit glueing their eyes to pedigrees entirely, and look to the production of this kind, and show the average dairyman a bull from a cow of that kind it will sell. I believe it is good business for you folks to think of that thing.

Milk Inspection.

I want to say a word in closing about this matter of milk inspection. I haven't the thing worked out to where I have a cut and dried plan that I am ready to lay before you. But I will say that this work and these things have been impressed on my mind by my observation so far. Therefore, if the state or the government, or whoever inspects that product, is going to determine the quality of the milk used in Pittsburg to-day they have got to inspect everybody's milk that comes in. It is not easy. It is impossible, it is impracticable, it is financially impossible to do that thing, at least in the near future. The quality of the milk is determined very largely by the conditions under which it is handled. Now I believe that our inspection should be directed more to the changing of conditions under which the milk is produced than to an examination of the milk after it is produced, because milk that is produced in clean places from healthy cows and handled in clean vessels is pretty apt to be wholesome and healthy. Then a very little inspection to guard against skimming and so forth will do the work . In order to do that our inspectors have got to be not medical students who are trying to work themselves through college, to medical school, and because of some good friend in connection with the board of health, or city alderman, get the appointment as milk inspector, but be some practical farm men who know when a stable is commercially clean. There is a cleanness that is theoretically clean, and can only be obtained in the laboratory. There is a cleanness that is dollars and cents possible. The cows can be made clean enough so they don't have to be curried, they don't have to have manure all over their flanks. The barn must be made light. The inspector comes in and sees the barn is not ventilated, and he tells them you cannot sell milk until you fix those things up. When our inspection takes that phase the great mass of milk that comes into our city will be better. We have got to have an inspector who not only knows what is proper, but has sufficient integrity, strength of character and good business judgment. One city inspector in a western city, if you paid something, your place passed inspection. We can't get rid of that entirely. I am like my friend, I believe most of us are honest all right, I believe that it is possible to get this class of inspectors when we go after them. Then inspecting these conditions means our seeing the milk shall be clean. If the man who produces and handles the milk has not a clean stable, you can't have clean milk. He has no facilities for getting hot water and cleaning the tins, scalding the tins in which his milk is handled. You may as well shoot at a stone wall as talk to him about cleanliness. You cannot get rid of the germs that come from lack of cleanliness under those conditions. I believe we have got to direct our inspection then at these conditions, and control them, and I think that the tendency is that way.

Now, one other point. The public, that great undefinable, ungetatable somebody that dictates what will or won't be, I believe we have got to put a part of our time in educating the public as to what good milk is. It is one of the purposes I had in mind, a scheme somehow or some way to show our public the difference between good and bad milk. I am open to suggestions or anything that will help educate the public, because the public is just like Pennsylvanians. Now, when we show the public that there is a real difference in milk, then they can understand. The average housewife talks about bacteria and things of that kind—it is something she listens to, but doesn't know what it means. A part of our effort must be directed to educating the public as to what clean milk is and what cold milk is, and the result in quality of having those few things.

A Little Experience.

I started out to sell cream in a little town where our college was situated. Our cream sold for ten cents a pint. I said to the best grocer in town, "I will sell you 40 per cent cream at 20 cents a pint." "Man," he says, "folks won't pay that price. They only pay 10 cents." "Yes," I said, "I know that. Are they satisfied?" He said no. I said I would send him over four pints. It was put up in paper packages so it did not have to be returned. I said, "You give that to four of the best customers. It is an experiment. Then you report." He started in. He took about five or six pints a week, and in a few months he took 40 to 50 at twice the price. Why? Because, in the first place, the quality was there, and in the next place I took pains to educate that grocer, and I told him that the whole secret of milk was keeping it clean and cold, and to tell his patrons how to keep it cold, tell them not to pour it in some dish that had been wiped with a towel. Here is a little thing—there are over three thousand times as many bacteria on that utensil which you have wiped with a clean towel after scalding it, as there were if you had simply scalded it and left it hot. I demonstrated that by experiment. It would not shine as if it was wiped, but it would be bacteriologically clean without wiping. If they take that kind of cream and set it in a pail of cold hydrant water, it will be all right. How many housewives, how many dairymen, who set their cans in water, know why it is? They do it blindly, because they have been told to do it, and still don't know why they do it. Because it simply gets the milk cold quickly. We took pains to educate. I had the grocer send back a can five days old. I asked him why he did it. He said he was afraid to give it out. It was perfectly sweet so far as the taste could detect, and the acid test showed it had not increased in acidity to the point where we could call it sour cream at all. I speak of that to emphasize the value of educating our consuming public. And while that was only a little bit of a spot in the great field, if each one of you created a little spot around where you are, just think how many there would be going inside of a year. Things grow pretty rapidly. You know one germ developing in an hour makes two at the end of the next hour and then four at the next. How many do you suppose it makes in twenty-four hours? 16,000,000. Just one every hour. Now if you made one little spot in which the public knew more about the quality of milk, and next year we got another and another, how it would increase! Around your neighborhood, as soon as they find out what you are doing, some of them will follow you. Then this gospel spreads, and after a while we can get our public educated to a better appreciation of the differences in milk, and then the man who has got good milk will have it known and a sale for it.

One way that is very effective is to advertise if you have a good milk. And if you can go to your local physician, get five of those physicians to go out to your farm and inspect your place and plant, and in a signed statement say that the herd was clean, the place was clean, that the milk is produced under clean conditions—they would not hesitate to recommend it—you can afford to pay $10 or $25 for a space in the local papers, and then print that statement. If you make the right kind of milk I do not believe you will find many towns where the physicians are not willing to do that. If you have got a city inspector whose word counts, get him to do it, or get any disinterested party. Say to the public, come and see whether they are right.

My talk has been rambling, and perhaps disconnected ,but the whole thing boiled down is this: There are lots of leaks in our dairy business. First, because we don't know them, and next, because we don't know how to overcome them. We have machinery to help overcome those things. We want to increase its usefulness, strengthen our educational field work, and have our dairy show and get these things going. There is a recognition of educational work to-day that is very gratifying and which is so just in proportion as that educational work bears dollars and cents in return. It is useful to the commercial man; it is a help to me if you will come up and see what we are doing at the State College. Anything we can do to serve the state which created the institution and supports it, I shall be glad to do my part in helping . I hope I may have the pleasure of seeing you all up there and showing you what we are doing.

Mr. Stover: Shall we put the milk into a hot vessel after sterilizing?

Mr. Van Norman: Yes . Scald it instead of wiping. Scald it and turn bottom side up on the shelf until you get around, and then when the customer goes out to the street, if that is the way you require them to do, have the vessel carried bottom side up, so the dust will not settle in it. Dust is the airship on which these germs of fermentation and putrefaction ride around.

Mr. Campbell: Would you think that a milk man that peddled loose milk, or a housewife that bought his milk was an ideal milkman or an ideal housewife?

Mr. Van Norman: It may not be the ideal way. It will be the way that will be used for a long while in a great many places.

Gov. Hoard: How many milkmen ever know or take any pains by special effort to educate a family how to take care of milk?

Mr. Van Norman: I know of only two or three . The number is small, but the success of those two or three makes me suggest it.

Mr. Martin: Wouldn't it be better to keep the temperature down below 40?

Mr. Van Norman: Yes.

Gov. Hoard: At a certain place we had 1,500 families in a city we supplied with butter in the winter. The butter was specially delivered to them. It was our experience that we had to make a special missionary effort to teach the average housewife how to care for that butter, in order to save our reputation. May it not be the same also in regard to milk? The average hired girl and the average refrigerator are not always the most savory propositions of the household.

Dr. Barclay: Now, this sermon we have just listened to by the Professor is the truth, the whole truth, and nothing but the truth. When he tells you that cleanliness and cold are the means of caring for milk, he told you, in my judgment, the whole truth.

Gov. Hoard: Is there any cowy odor in the milk, unless there is manure introduced into the milk?

Prof. Van Norman: This much we do know, the new milk aroma is a little different from what it is any other time.

Gov. Hoard: That it is very volatile.

Prof. Van Norman: And very soon goes away.

Dr. Armsby: We have been experimenting by putting an animal into a box, a respiration apparatus so-called, where we analyze all the excreta in the course of that experiment. We pumped air through that box to ventilate it. Most of that air discharged out into the room where we were. The solid and liquid excreta is dumped into a box under the platform, and under those conditions we could scarcely detect any of that cowy odor in the air as it comes out. You can notice it. In a thousand cubic feet of air discharged into the room very little of the odor was noticed. When we opened that box down below, then you get the cowy odor strong, and moreover the particular thing that carries the cowy odor in our experience is the urine, not the solid. With a little bit of the urine on anything that cowy odor will cling to the thing most persistently, so I think the cowy odor is just as you say, it is in the milk.

Prof. Hills: A good many years ago at the experiment station we tried a series of experiments of this matter of aerating milk, at one time in cold water, and another time in artificially warm but otherwise pure air. And what we drew from that experiment was that it was not so much the aeration as the cooling of the milk that did the business. The air, as such, is not a medium which promotes or increases the keeping of the milk. It is the cooling one gets incidental with the aeration. Now, there is another point about this "loose milk"—that is a brand new term to me, I never heard it in New England. One of my associates of former years is likewise a milk dealer, and he had a herd of 750 grade Jersey cows. Up to about ten years ago milk was peddled through that city in this loose fashion, and he was the first one, I think, to put it in the common sense bottle, and he was a man who was brought up in a college atmosphere and one in whom the spirit of investigation was strong. He said to himself, I want to determine whether this is a dollars and cents proposition, to put in this bottling, and I will do it for a year and keep an account. He made a careful estimate. He found that from the standpoint of dollars and cents the putting in of those bottles as a means of peddling milk, as against peddling loose milk, was a saving to him. The question arises, How can that be, when you take into consideration the initial cost of those bottles,

and for the mechanism for filling the bottles? He found it to be quite an economy. It did not pay in one year the whole expense but it paid.

Prof. Van Norman: In connection with the bottles, I may make this suggestion. Those of you who take up bottling, or who are making a change in your methods, consider the advisability of paying your driver on the basis of a minimum guaranty, say $30 or $35, and a certain per cent for every hundred bottles brought back.

A Member: What do you consider the best kind of cow stall?

Prof. Van Norman: The stall which will give the cow the most liberty and keep her the cleanest. Each one will have to figure out to suit his own conditions and case.

Mr. Hulton: Would you advocate the use of a manger at all?

Prof. Van Norman: The question of a manger depends upon what you mean. A manger is where the cow eats her feed.

Mr. Hulton: No manger at all, simply a hay rack to feed from, galvanized buckets, and rinse out clean every time you feed. And no feed left in the manger to make dirt.

Prof. Van Norman: Any method that works is all right. If it works it is good. To me the labor of the cleansing of those buckets every day would overbalance the good.

A Member: Haven't you found it is hard to keep the cow clean where the manger is used?

Prof. Van Norman: If you can keep the cow back with her heels on the edge of the trough, you can keep her cleaner. Now, then ,does the advantage of the loose bucket that has to be washed after each use, pay for the labor?

Mr. Norton: It was moved and seconded that a committee of three be appointed to nominate officers for the ensuing year. Motion seconded and carried.

The chair appointed Mr. W. C. Norton, Henry Palmer and J. F. Lantz.

Recess until 2.30 o'clock.

AFTERNOON SESSION

Meeting called to order by the President at 2.30 o'clock P. M.

The President: The first order of business is the election of officers.

(Committee on nomination and auditing committee reported not ready.)

The President: Are there any resolutions or miscellaneous business to be presented? If not, the first regular order of business is the discussion provided for by vote this morning, on the general question of Dairy Inspection, we may so phrase it, not milk inspection but dairy inspection, inspection of the sources of supply. I call upon Gov. Hoard to open the discussion .

HOARD ON INSPECTION

Gov. Hoard: Mr. President, I am quite familiar with all the work which is being done to-day in Wisconsin. Let me say in the first place that we have about 3,000 cheese factories and creameries, and we have somewhere in the neighborhood of 150,000 to 175,000 farmers contributing milk to those institutions. We have been confronted, in the progress of our dairy work, with the difficulty of securing cleanly work on the part of the cheese factory and the creamery and the farmer. We have suffered severely in the revenues of the state. We are suffering in Wisconsin, just as you are in Pennsylvania, from the indifference of the farmer to his own education. A large proportion of the men who supply milk to the cheese factories and the creameries in Wisconsin do not read a word. I would say not over fifteen or twenty per cent of the men in Wisconsin who supply milk ever read a word on dairy subjects. That is a larger per cent than is to be found in almost any state. It cuts out a large percentage of his profit, it makes him helpless before the difficulties of his own position. You cannot put the knowledge and understanding into his mind if he will not familiarize his mind with principles. In like character, but not to that extent, do we find men running cheese factories and creameries in the state who won't read or study, and who have no contact with information. I think the most powerful word in all the English language is that one word of seven letters, c-o-n-t-a-c-t. Men educate themselves and grow in knowledge and understanding in proportion as they have contact, with books, ideas, things, men. Now, when a man refuses himself contact, what then? By an inverse ratio he becomes not as gods, knowing good from evil, but becomes a helpless creature to his environment. Now, we found hundreds of men running cheese factories and creameries in an unsanitary condition. We found ignorance deified, ignorance worshipped, rolled as a sweet morsel under the tongue, men worshipping ignorance. Let me give you an example. In one county in Wisconsin, occupied chiefly by Swiss people, ten million pounds of Swiss cheese is produced. We could not get those Swiss people to have any affiliation with our educational movement, with our dairy association, with our dairy conventions, with our farmers' institutes. Like the average German everywhere throughout the world, they were full of their own racial prejudice, and I am part German myself. These Swiss people were full of their own conceit, and nobody on earth knew as much about making cheese as they. All at once there broke out through that district a tremendous disaster. One factory lost $3,000 worth of cheese, the cheese were bursting with fermentation. As one old German said to me, "What you call the devil is to pay." "Yes," I says, "I guess so." For the first time in their lives they saw they needed the help of science on this question, and that their conceit did not help them a bit, and they appealed to the Wisconsin association, and we sent an inspector to examine the condition of things. And what do we find? In the rear of each factory was a row of barrels, sunken in the ground, and each patron had a barrel, and every patron's whey was put into that barrel, and that barrel had not been cleaned in years, and the patron put that stinking rotten whey into the can that he brought his milk to the factory in, and took it home, and then the housewife cleaned, and maybe she did not. Anyway, the milk came back to the factory reeking with bacteria and fermentation and all things whatsoever vile and unrighteous. And what was the result? Thousands upon thousands of dollars lost to those people because of self-conceit and ignorance. Now, then, we finally prevailed upon those people to listen. Professor Russell, our bacteriologist from the University, was sent down, a very practical man, not only a scientist of the very first water, but a constructive, practical man as well. And he went down there, and he did what he could, and we sent the inspectors, and the inspectors went around among these different creameries, and these cheese factories, and commenced to teach that cleanliness was among the first fruits of righteousness and good cheese making. The difficulty was cured. These men, for the first time in their lives, saw how they had corrupted their own fortunes. That is one of the things an inspection force was able to do.

In Minnesota and Wisconsin.

Now, then, we found that finally we worked up a sentiment in Wisconsin to such an extent that we prevailed upon the legislature last winter to give to the dairy and food commission an additional force of eight inspectors, an additional chemist, so now the dairy and food commission has a force of I think 14. Minnesota is ahead of us. She spends about $30,000 a year in fostering and promoting the dairy interests. Wisconsin will stand in the neighborhood of twenty to twenty-five thousand. Wisconsin has been paying to its own state dairymen's association, not an incorporated body, a body which I may say I first organized myself in 1872, $2,000 a year for doing educational work in the state. Now, then, we have got our forces into shape. What have we done? We have prosecuted 24, dirty, filthy cheese factory men after sending an inspector around and saying to those men, "You must conduct your factory according to law; your factory is in an unsanitary condition. You have no right to ask the patron to be clean in his milk if you are not and will not be clean in the handling of it." Those men paid no sort of attention to this work. The inspector went there a second time, and they laughed at him, and some of them threatened to drive him out of the factory. Ignorance, Ignorance! There was a time when God winked at ignorance, but He got tired of it. Ignorance! The conceit of ignorance, the willfullness of ignorance, the danger of ignorance. What result? Commissioner Emery proceeded to prosecute these 24 men for keeping their factories in an unsanitary condition, and they were fined severely—from $25 to $50 apiece. Then there was a waking up and a shaking of dry bones. Creamery men have been prosecuted. Now, the law says, in addition, that no farmer shall bring milk to a cheese factory of creamy in an unsanitary condition. And the law bears upon the milk producer as well as the milk handler, and I want to say to you gentlemen that I never saw such a quickening of the dairy sentiment of the state of Wisconsin as has happened since the passage of these laws, and the beginning of their installation. Now, this is an important thing, a very important thing to all of us.

They Woke Up!

Now, I say this about the inspection business, that one of the most valuable things to-day is that it compels the farmer, stops him and compels him to exercise his mind. He begins to say, "Well, what is this thing that is going to happen to me?" And you will find that at the cheese factories and creameries, the patrons will come together; it provokes meetings among them. The creamery man, the butter man is called on to explain to these people what this law is, and there is a beginning to face, for the first time in their lives, the actual real responsibility of their action before the law. That is conducive to thought, and that compels men to study. I want to say to you, gentlemen, we have never seen anything that has taken hold of the mentality of Wisconsin, particularly the agricultural classes, like the establishment of this system of inspection throughout the state. Now, I believe, I know, that Pennsylvania is a great dairy state, if it only knew it itself. In Pennsylvania you are like a great rope of sand. You are not organized, you are not compact, and you are not put in the shape where you can act and re-act on one another. Wherever in the United States you find a state so organized and so compact that its action and re-action, flection and reflection, upon one another, in this state legislation has followed. and the state has been put upon advanced ground. You will find in every instance that great financial prosperity has followed such action. And if I were to appeal to you from no other consideration than that of the most sordid character, the dollars and cents there are in it, I would say, move upon your legislature under wise direction for the enactment of such laws, and for the creation of such forces.

Mr. Norton: What brought to my attention to this matter in the first place was I found we had no way of making our patrons make good milk. They would keep their cows dirty ,and bring us dirty milk. I got to thinking over the subject. I saw that this dairy inspection law in Michigan and Wisconsin was working well. I could see no reason why our state should not have a similar law. As Gov. Hoard has stated we are behind the times in Pennsylvania in our interests as dairymen. It is time we woke up. You cannot make pure milk out of milk that is contaminated at home. Dairy inspection must begin at home. It does very little good to inspect that milk after it reaches the city, or after it reaches the creamery. You cannot pasteurize the dirt out of milk. Mr. Reichert brought up the question this morning he did not believe in a compulsory law. Well, I do not know; I have had a good deal of experience with farmers. I know a great many men unless you have got something that will compel them to do a thing, will not produce a good article. It has to be compulsory. In my mind a law that is not compulsory is no use in Pennsylvania. I do not know what it may be some other place I think I can safely say the Breeders' Association of the state will be ready to help you all.

Prof. Hills: The result of the inspection in our state has been to lessen the amount of butter that is made.

Dr. Barclay: It seems to me that this question is one of paramount importance, and that milk, as all other products, should be sold at its real value. If we had a law that would compel inspection and that would pay the producer the real value of the product, it seems to me that would encourage and benefit the dairyman.

Mr. Wagner: Possibly we might have force added to the Live Stock Sanitary Board. I would like to hear from Dr. Pearson what the Live Stock Sanitary Board is doing in the way of improving the condition and output of the dairies of the state; also whether he could not give us some plan or suggestion by which we could improve the product by adding to the force of the Live Stock Sanitary Board.

Dr. Pearson: This subject is one I am very much interested in, and I think that I can see in this direction a chance for great dairy improvement from every standpoint, from the standpoint of the purchaser of the milk, the creamery man, and of the consumer. When dairying was conducted in a simpler way than it is now, before the days of co-operation, a fault on the part of one producer injured his own product, but did not injure the product of his entire neighborhood. Now, under co-operation and under the creamery system, a few careless producers not only injure their own product, though it sells for a lesser price than it otherwise would, but they injure the product of their careful neighbors. Apparently there is no effective way of reaching these careless men excepting by some sort of inspection ,and as Mr. Norton has brought out, there appears to be no particular advantage in rules or laws of inspection unless there is some means of enforcing them, unless some penalty is provided for violation of the standards that are adopted. If such a thing as this is carried through I should be in favor of a very moderate standard to begin with, but with the understanding that these standards would be increased as rapidly as the conditions of the trade warranted. In my work as State veterinarian I come across some places where milk is produced that cannot but be of tremendous harm, both with relation to the character of the producer of milk, the milk value, and the product, and also with regard to its wholesomeness. There is, at present, no general inspection law under which a joint inspection can be made with a view of discovering such conditions, and I think that it would be a step in the right direction and a step decidedly progresssive to take some action such as has been proposed.

The President: This is an important subject, and I hope we shall not leave it without taking some action, looking towards the accomplishment of some practical results. It is a good thing here to-day, and if we limit ourselves to that discussion, we shall not accomplish very much.

Mr. Norton: I have a resolution.

The President: That would be in order.

Mr. Norton reads resolution as follows:

RESOLVED, That the Pennsylvania Dairy Union advocate the passage of laws requiring efficient inspection of places where dairy products are made and handled. And further that the Board of Directors is hereby instructed to look up the laws of this and other states, and see that a bill is introduced into the next legislature to secure such inspection.

The President: What action will you take in regard to this resolution?

Moved that it be adopted. Motion seconded.

The President: Is there any discussion?

Mr. Reichert: I should like to ask a question if it is in order. It seems to me, that in order to get the greatest amount of good out of any bill that we might present to the legislature, that there should be a committee to consider the character of the bill that is to be presented, and that all the members of the Dairy Union throughout Pennsylvania, in fact all dairymen, should be invited to send communications, with suggestions to that Committee, so that in addition to getting the benefit of the laws in the other states we would have the suggestions of our own dairymen throughout Pennsylvania, and make a law as thorough as possible. It seems to me that would be the shortest and the best plan to get at it.

Gov. Hoard: Why not create here a committee on legislation?

Mr. Reichert: That would be better, and then invite ideas.

Gov. Hoard: To whom the propositions come, with instructions that they prepare from all this date a suitable law to be proposed to the next session of your legislature.

Mr. Reichert: That is my idea exactly, to get the views of all of our people throughout the State to give the committee a chance to know the wishes and opinions of the people through the State. I think that would be a very desirable way to get at it.

Mr. Reichert: Has the chair some plan by which we can embody that in that resolution?

Mr. Norton: We decided we would leave that in the hands of our directors. No one is more alive to the interests of the Dairy Union and the dairy people of the state than our board of directors. In the resolution you will also see it gives them the authority to get the laws from not only our own state, but from other states before drafting this bill. Now, so far as the bill is concerned, that is something we cannot do to-day. It has got to be left with these men to draft, and I personally think it should be left with the board of directors.

Prof. Van Norman: There is nothing to prevent the board of directors, if they do not care to undertake it ,appointing a committee from their number to take charge of this thing, to be a legislative committee.

Mr. Wagner: The board of directors can gather all the information they choose on the subject, and present it to the next annual meeting which will be before the meeting of the legislature, and the bill can be discussed at the next annual meeting unless it would be possible to bring it up at this present session.

Mr. Norton: I do not believe that this ought to be left for the next annual meeting. I believe that the incoming board of directors and president and secretary should take this matter up at once. My experience in the legislature is you do not want to wait until the last minute before the legislature convenes. I may be wrong, but if you want to put this in form of a motion, I feel that it ought to be left with the board of directors to pick a committee here to-day. I don't know whether they will wish to do that or not.

Mr. Statton: I am from the Buckeye state, and I have had some connection with our State Dairy Union there. We have not got the legislation we want, but we have not been hustling as we would like to see you hustle. It takes a lot of nerve and push to get a thing like this through, and this board of directors will certainly have that if they are heartily supported by the people. There is no better way to inspect people out of business than to set out in this inspection, and there is no better thing for the dairy industry of Pennsylvania and Ohio than to inspect about one-third of the dairy people out of the business that are now in it.

The resolution being put to vote, it was unanimously carried, and the board of directors are instructed accordingly.

The President: We will now listen to an address by Prof. C. B. Lane, of the U. S. Department of Agriculture, on "Some Phases of the Dairy Industry."

SOME PHASES OF THE DAIRY INDUSTRY

Prof. C. B. Lane, U. S. Department of Agriculture.

This has been a year of great prosperity to the dairymen of the country. Both butter and milk have sold for higher prices than last year and these combined with increased production have given a value to dairy products of fifty-one million dollars above the estimate of a year ago. The income of the dairy cow is only exceeded by the corn crop. It is significant that when the dairy farmer is prosperous others who have anything to do with the development of the dairy industry share in the profits. For example, the dairy supply houses, dairy publications and manufacturers of dairy products of all kinds. Our population is increasing faster than the supply of dairy products. I believe, therefore, we can expect profitable prices for high-class products for some time to come.

Quality of Dairy Products Improving.

In spite of the sensational articles which frequently appear in the daily press, to the effect that milk is produced under filthy conditions, that typhoid and scarlet fever are disseminated through milk, that butter is adulterated with renovated and cotton oil, and that cheese is poor in quality, when we take a broad view of the matter we find that dairy products as a whole were never better than they are to-day. Take, for instance, the milk supplied to the city of Boston. One of the up-to-date milk contractors recently had the milk from the entire number of farmers (119) furnishing him with milk from a single town, examined for bacteria, and they found that only 2½ per cent below the Boston requirements. This may be taken as a fair illustration of the condition of things in a community of intelligent milk producers.

Again, the mortality of children under five years of age has been reduced from 43.84 per cent in 1875 to 28.87 in 1904. Both New York and Philadelphia show a similar improvement. There can be no doubt but that this improvement is due in no small degree to the better farm conditions and better laws and health regulations. The result of the recent case in Philadelphia, where two grocers were fined $250 each and sentenced to 60 days in the county prison for supplying oleo as a substitute for butter, shows the activity of inspectors to put down fraud.

The demand for high grade products is increasing. Many of the certified milk producers are unable to keep up with the demand for their products. One party I have in mind, who is selling the milk from 500 cows at the rate of 15 cents per quart, told me that the demand for their products was so great that they were already preparing plans for a barn to accommodate 800 cows. Another made the statement that if he had a million dollars to invest he would put it into the production of certified milk. The demand for milk of high quality that is not sold under a guarantee is no less noticeable. Many have advanced the price with the result that they have not only held their regular customers, but added many new ones.

Practical Results of an Experiment.

A discussion of this matter from the practical side will doubtless be of more interest to dairymen. I wish to give here some of the actual results secured from the dairy herd at the New Jersey College farm, when in my charge, and the sale of its products in retail trade . The sale of milk was made in competition with other dairymen, without any other advantage than a good product. The number of milch cows in the herd ranged from 23 to 30 and they were largely grades. The composition of the milk of the different animals ranged from 2.8 to 6.4 in percentage of fat, and averaged 4.3 per cent. The standard of richness for the milk as delivered to consumers was fixed at a minimum of 4.0 per cent fat, as it was found that with care in the arrangement of the animals in the barn, so that the milking might take a certain order, it was possible to furnish from day to day, a product that was practically uniform in composition. This herd served in carrying out a practical experiment on a large scale, to determine whether uniformity, richness and purity could be practically accomplished, and whether, if these characteristics were possessed by milk delivered to consumers, the result would be a larger consumption at a better price. The experiment began in 1896, and during that year it was only possible to in part guarantee uniformity and richness as it was necessary first to improve the buildings in a sanitary way, remove the unhealthy animals, arrange for better cleaning of the animals and stables and for proper handling of the milk, and to teach all connected with the work the importance and necessity of cleanliness. T his was not finally accomplished until late in the summer of 1897, when a dairy house was built, which enabled an immediate and rapid cooling of the milk and its storage at low temperature until delivered, as well as the sterilization of the necessary utensils. In the meantime, however, the relative advantages of different methods of delivery were studied, and the marked advantage of the bottle system from the sanitary point of view was so obvious that the consumers were encouraged to take milk in this form rather than from the open can.

The product was sold entirely upon its merits. No persons were solicited to purchase milk, no advertising was done, and in

no case was the milk sold for less than six cents per quart for the six months beginning with May, and for eight cents for the the remainder of the year. The sales made during the year beginning April 1st, 1896, when progress was being made in the production of milk of a uniformly high quality, and during the years 1898 and 1899, when to these characteristics purity was added, are actual statements taken from the records. The results are as follows:

During the year beginning April 1st, 1896, the sales were 64,616 quarts; the following year (1897) the sales were 68,230 quarts, the gain being but 3,614 quarts, or 5.6 per cent more, while in 1898 the sales were 78,839 quarts, a gain of 12,373 quarts or 18.9 per cent over the sales in 1896. Again, the sales for 1899 were 81,930 quarts, the gain being 17,314 quarts, or 26.8 per cent over the year 1896. That is, though uniformity and richness were practically maintained throughout the first two years, owing to unclean animals and stables there was frequent complaint of bad flavors and souring, and sales increased slowly, but as soon as the milk delivered possessed the three characteristics mentioned at the outset—namely, uniformity, richness and purity—it began to sell itself and no legitimate complaints were heard. The increase was marked and has been increasing from year to year; in fact, we have sometimes had 25 customers on the waiting list. The increase in sales of 18.9 per cent in 1898 is, on the average, 33.6 quarts a day, which, at the price received, an average of 7 cents a quart, is a total gain to the farm of about $1,000.00 in the annual income. This is obtained too without other increase in the cost than in the extra animals required and in the feed, the labor required for handling the milk, both in production and delivery, is the same as that found necessary in the smaller product. The results of this experiment show that there is wide room for development along this line, that dairymen can, by attention to these matters, both increase their sales and secure a better price. The key to the situation is the making of a better product.

A statement of the September receipts for milk in New York City shows that there was a total increase of milk, cream and condensed milk over the same month in 1894 equivalent to 84,848 cans of plain milk. This should give some encouragement to the producers. The conditions for manufacturing butter in this country are as good as in any, and one reason we do not produce more high grade butter is because of carelessness on the part of creamery and cheese factory patrons. We are eating all the high-class butter we produce and millions of pounds of oleo, butterine and renovated butter besides. Of all nations, the Americans are the great butter eaters. This cannot be said of cheese, and the consumption of this product should be encouraged because it is both a healthful and economical article of food.

Production Too Low.

One of the weakest points in American dairying is the low production of our cows. We certainly cannot point with any pride to the record of the average cow in the country, which is about 3,560 pounds of milk and 152 pounds of butter. I believe it is safe to say that more than one-half of nineteen million cows do not pay for the food they eat. To illustrate: Of one hundred herds in a New England state recently canvassed by "Hoard's Dairyman," the average pounds of butter fat produced per cow, per year, was reported to be one hundred and fifty, equivalent to one hundred and seventy-five pounds of butter. This is a little higher than the average for the herds for the whole country, it is true, but it is only about two-thirds of the yield that could readily be obtained with care in selection and feeding. Sixty-nine herds out of the one hundred failed to pay for their feed. The best herd returned $20.75 per cow more than the pay for their feed. This record can easily be made by every dairyman. The owner of the poorest herd lost $21.68 for every cow in his herd of sixteen, which is more than the best herd gained. Patron 80 which had the most profitable herd (made up of grade Jersey cows) it is reported, gave them the most intelligent care. Hay and corn fodder formed the roughage, and 4 to 7 pounds of wheat bran and cotton seed meal were fed, while the cows were in milk. A warm, well lighted stable was noted. He was a reader and careful student of the needs of the dairy cow. Patron 74 had the poorest herd, made up of 16 grade Jersey cows also. Hay and a small amount of ensilage were fed and about six pounds of brewers' grains, wheat, bran and cotton seed meal. The trouble here was not with the ration, but poor cows and poor care. The business must be studied from all sides. Here we have a difference of 112 per cent in two patrons living less than a mile apart, under practically the same conditions, and a difference of $42.40 in the net income per cow. The difference in profit must be attributed largely to the difference in the intelligence put in their business. Here is an opportunity for dairy missionary work that I believe would be appreciated.

Many dairymen make the mistake of thinking that it is enough to know what the whole herd produces month after month, and what the whole herd tests. They depend too much on the returns from the creamery or cheese factory. Let us analyze this plan and see how much it will help to improve the herd in the future. It does not help any. To be sure, it enables you to compare one month with another; it shows you the average for your herd. We will say this is 4 per cent, which is good for a herd of grade cows, but you may have some cows that test 5 per cent fat and others that test 3. The low test is not so bad as it seems provided the cow gives milk enough. Let us see how this figures out. A cow giving 5,000 pounds of 5 per cent milk would produce 250 pounds of butter fat. A cow producing 8,300 pounds of 3 per cent milk would also give you practically 250 pounds of butter fat. But suppose a cow gives you only 3,600 pounds of milk, which is about the average for the cows of the country, even if this contains 5 per cent fat the chances are that you are losing money. Even the best of cow experts cannot tell by the looks of a cow what quantity or quality of milk she will give. A thousand pounds of milk in her annual yield one way or the other may determine between profit and loss. Again, many cows go dry a month or six weeks longer than they should. This often puts them on the unprofitable list. Many cows leave worthless heifers in the herd which continue to eat up the profits and keep the dairyman from having some of the luxuries of life which every man in the dairy business and every kind of business ought to enjoy. So we see every dairyman ought to look to the future as well as the present and to build up his herd on a solid foundation.

Everything in these days is measured by its capacity for work, or, in the case of the cow, by her production. A man is paid, or ought to be paid, for his ability to work, either with brain or muscle. The value of a trotting horse is measured by his record. The value of a dairy cow depends upon her capacity to produce milk or butter. That is her actual value, but is that the basis on which she is valued in our dairy herds as you see them through the country? Strange as it may seem, most dairymen have no basis—old brindle or spot, while they may not pay their keep, have been in the herd so long that they have become old friends and their owner loathes to part with them. If we are dairying for fun, all well and good, but if we are conducting it as a business it is time the dairymen used business methods. It is not enough to know that a cow gives a pail full of milk, when she is fresh; we want to know what she produces in a year. Dairymen have a good goal to work for in the record of the Guernsey cow, Yeksa Sunbeam, who produced an equivalent of 1,000 pounds of butter in one year, from 14,020 pounds of milk. This record was the result of careful work in breeding, feeding and all that pertains to the health and comfort of a cow.

Cow Test Associations.

I want to endorse the idea of establishing Cow Test Associations. The first in this country which was organized in Newaygo county, Mich., September 26th, has now adopted constitution and by-laws and began work October 15th. Other states should fall into line. These associations cannot fail to be strong agents in improving the milk production of the herds of the country. The various associations should get together and adopt uniform systems of keeping records so that ready comparison can be made of the production of the herds in different sections of the country. This will naturally result in competition for highest records and a desire on the part of each association to make a reputation for the section of country they represent.

The plan is practically this: 15 or 20 dairymen form an asosciation and pay one dollar for each cow per year to help defray the expenses of the test, hire a competent person to do the work, board and lodge the official tester while at their farm, say once in two weeks, buy all the necessary apparatus and make all arrangements to have the work carried on accurately and systematically. The tester visits each farm regularly, weighs and tests the milk from each cow, figures out proper rations for each dairyman and gives such advice as he may need. At the end of the year the dairyman has a reasonably accurate record of every cow in his herd, and he knows what it has cost to keep them, and he can easily discard the unprofitable animals.

Many Dairymen Would Improve Their Condition if They Were Told Exactly How to do It.

I was interested in going through a barn a short time ago where the dairyman took much pleasure in showing me his herd, and he stated that he thought his conditions were almost ideal. While there was some improvement noted over other barns in the vicinity, such as the swing stanchions, a fairly good floor for the animals to stand on and a gutter behind the cows to permit of easy removal of the manure, on looking at the conditions more critically it was noted that there was not more than one small window to every dozen cows, that the ceiling was low, allowing less than 200 cubic feet of air space to each cow, that the mangers were heavy wooden structures with decaying feed in the corners, that cobwebs were hanging from the ceiling and the wall in the rear of the cows was coated with manure. This dairyman was willing to receive instruction and have undesirable conditions pointed out to him. He had seen but few dairies outside of his neighborhood and really didn't know that there was anything better.

The Man Behind the Cow.

Among the factors which enter into the economical production of milk, the man who handles the cow is the most important. The man who naturally likes sheep or who would rather feed steers than cows or who has not a keen interest in dairying will not produce milk economically and will not keep his cows up to their highest production. Then a man should select a breed which he likes, a breed which he is ready to advocate to his neighbors and to stand up for on all occasions. There are men who would rather have specks in their butter than spots on their stock. The man behind the cow must be a man who treats her kindly, a man whom the cow likes to have around. If she chews her cud during milking time you may know that all is well and that she is doing her best at the pail. We must see that the cows are comfortable all the time. The Kansas station in a recent test found that cows exposed to a temperature ranging from 18 to 50 degrees for several days at a time lost 12 per cent in quantity of milk, and 11 per in butter fat. These animals were fed three pounds more of the grain ration, but their weight was approximately the same, the loss including feeding amounted to $.07 per cow per day. (There were 52 days when the thermometer registered 32 degrees or below.) Accordingly, the total loss for the year per cow is $2.24, or $48.80 on a herd of 20 cows. We see here how much depends upon the man behind the cow.

The Milking Machine in Milk Production.

The contentment of the cows is very noticeable where some of the milking machines are being used that have come the nearest to perfection. I have seen a whole line of cows that were being milked with machines chewing their cuds as if nothing was going on. Where the teat cups are carefully adjusted to each cow to her satisfaction and comfort and the same size used on the same teats attached to the same machine with the same degree of vacuum produced by the same power, you practically have the same milker and a good milker at every milking every day. If this is not conducive to good results I do not know what is. Now I am speaking of the milking machine, I want to say that I believe it is one of the advance steps in dairying. I have watched its workings very closely for a month and the recults obtained indicate that it is entirely practical. That it is a labor saving device there is no question. For example: Two men with the machine will milk a herd of

60 cows in less time than it requires four men by hand. This makes it possible for the other two men to go into the fields with the teams early in the morning and work until evening, as it is not necessary for the drivers to take part in the milking. This is no small item, as on many farms it would amount to $10 per week in cash and for 30 weeks a net saving of $300.

The scarcity of milkers and the unreliability of many of them has had a tendency to keep many men from going into dairy farming. Some dairymen who have been in the business have been obliged to give it up for this reason. Great interest therefore centers around the milking machine, especially where scarcity of labor exists. It not only requires about one-half the labor to milk the cows, but it is believed that the labor employed will be of a higher class than heretofore, and will also command higher wages. It is believed, further, that the advent of the milking machines will have a tendency among farmers who now have small dairies to enlarge their plants and to make dairying their chief business. The trouble has been in the past that too many farmers have made dairying secondary to other work, and when anything had to be neglected it was always the dairy, and for this reason the profits from their dairies have been small. Where the milking machines have been introduced they have influenced dairymen to clean up their farms and to take more pride in their work. This naturally will result in the production of cleaner milk and in some cases better prices. Any practical apparatus which has a tendency to improve dairy conditions should be welcomed by the industry.

The Milking Machine Must be Kept Clean.

If the milking machine is not kept sanitary it will be a step backward rather than forward in the production of milk. Actual tests have shown that where the machines were cleaned by simply rinsing in warm water the bacteria in the milk drawn by them runs up into the millions per c. c. On the other hand, where boiling water or the steam sterilizer is used in connection with germicides, the bacteria in the milk may be practically reduced to the infection which comes from the cow teats. In some cases the test has been as low as 400 bacteria to the c. c. It will be seen therefore that the machine offers great possibilities to the producer of high-class milk. Success here depends upon the man behind the milking machine.

The milking machine will work out in practice very much the same as the farm separator. When separators were distributed by the thousands through the West, the farmer, at the start at least, didn't keep them clean and the result was a lower grade of butter at the creamery. But when the farm separator is kept clean the cream coming from it is fully as good if not better than when separated at the factory. Success depends upon the man here again.

Dairy Qualities as Measured by Product.

I believe the time has come when we should pay less attention to the form of the dairy cow and more attention to her power to produce milk. It is all right to have dairy type, but production should go with it. During the past few months I have compiled some ten thousand records and secured photographs of many of the cows in each breed having the highest records. While these high record cows are not such as would be selected for their good form in many cases, yet they have the productive capacity as shown by the scales.

Department Trying to Get Closer to the Dairymen.

In the earlier part of the Dairy Division of the Department of Agriculture the main object in view was to collect and disseminate information on all phases of the dairy industry in this and other countries. Seventy bulletins have been prepared during the past ten years TELLING dairymen facts about the business and how to carry it on, but more recently we have seen the necessity for taking more information direct to dairymen and SHOWING them by means of object lessons and in a practical manner how to do things. I have only time to just mention a few of the lines of work that have been taken up from this standpoint. One that promises to be very helpful and practical is the establishing of what may be termed "demonstration farms" in the South. For nearly a year a dairy expert has been traveling from place to place through the Southern States looking up the conditions and favorable localities for establishing demonstration farms. The idea is to assist in making these farms models in every respect so that dairymen in the surrounding country will have a place where they can see for themselves modern methods of dairy management.

Another line of work that has recently been taken up and which is attracting widespread interest is the improvement of dairy barns. This is really a campaign for clean milk. The subject is of great importance from the standpoint of health when we consider that milk is used daily by almost every family in the country, and that the milk produced annually amounts to over seven billion gallons. There is no question but that there is need for much improvement in this direction. Ask the dairy inspectors through the country what they find and they will tell you that a large percentage of the barns are dark, damp and poorly ventilated, and have the odor of manure and other decomposing matter. These conditions contribute unhealthy germs to milk and keep the cows unhealthy. Since the Dairy Division began the work of improving dairy barns letters have been received almost daily asking for plans showing proper barn construction. Plans and specifications are now being prepared by the Department architect and some have already been furnished to a number of dairymen. We hope soon to have plans drawn for types of barns suited to different sections of the country, so that dairymen in any particular section can have a plan suitable for their conditions. It is as easy and cheap to build a barn right, observing conditions which contribute to sanitation, as to build it wrong. We do not expect to reform the whole system in a few weeks but we want to help the poor farmer as well as the rich to have the best barns possible. It is hoped to soon extend the work to include silos, dairy houses, ice houses, etc.

The Dairy Division is also carrying on work in co-operation with Experiment Stations and studying problems in butter and cheese making, transportation and storage.

There are many other problems which need attention, among them may be mentioned breeding for more profitable cows, questions of feeding for flavor and color in butter, regulating the amount of moisture in butter, pasteurization of milk, etc. The Government desires to solve these problems and many others. We can accomplish much more if we have the asistance and sympathy and co-operation of your association, as well as those of other states.

President Armsby : We will postpone the discussion of this paper until we hear from Director Hills, who will tell us some Things Science Has Done for Dairying."

SOME THINGS SCIENCE HAS DONE OF LATE FOR DAIRYING

Prof. J. L. Hills.

Mark Twain in his inimitable "Roughing It," tells us of a revolver which "if it didn't get what it went after it would fetch something else." Concerning it he further remarks that when fired "there was no safe place in all the region round about but behind it."

Now my talk to you to-day bids fair to be somewhat like this "dismally formidable" weapon. It is a scattering discourse, and there is "no safe place in all the region round about it;" for it is aimed at the man beside the cow who milks her, and the man in front of the cow who feeds her; at the man who separates her milk, and at him who churns the cream; at the cheesemaker, at the creamery manager, and at the maker of market milk. You are all in line with its muzzle, but luckily it is not loaded with fault finding ,but with facts. What I have to say breathes of optimism rather than pessimism. The message of modern science to dairying is helpful and inspiring, though it often lays upon the individual a greater responsibility because of increased knowledge.

What are some of the things which science has done of late for dairying? Let us at the outset get a clear conception of the meaning of the word science. The last generation of farmers almost to a man balked at it, and many to-day look askance at it as in no way allied to or helpful in the pursuit of their calling. This attitude seems in part due to misunderstanding as to what science is and does. Science indicates the results attained in the search for truth, grouped in such a manner as will aid in showing the relationships of these results to each other. Science, in other words, is "an orderly arrangement of well ascertained facts." The results of some lines of research may seem at times to be quite without practical bearing. But we should remember, when tempted to style any such work as useless, that a notion which is derided by one generation as impracticable, or ,indeed, false, often becomes an everyday affair in the next generation. For instance, the inventor of photography was placed in an insane asylum because he claimed he could transfer his likeness to a tin plate; Franklin's ideas as to the nature of lightning were laughed at, and Galvani was called a fool and "the frog's dancing master" because of his study of galvanic electricity.

Science does not pretend to say the last word. It formulates theories to discard them as new discoveries lend further light. It, like practice, is ever an evolution. Hence it follows that I may tell you some falsehoods to-day; nothing that I know to be such, yet, notwithstanding, untruths. My statements represent what I believe is held to be true to-day, but which 20, 40 or a 100 years hence may be otherwise regarded. This does not imply that present conceptions are useless, though they may be erroneous. They may prove helpful, even if they are not immutable.

To cover all that science has done even in this one line, were impossible. One must draw the line somewhere; hence I speak only of "some things" which have been done "of late." My talk on this account is disjointed rather than connected, and suggestive instead of didactic. I shall take it for granted moreover that you have a grasp upon certain of the fundamentals, for a dairymen's meeting is on a higher plane than a farmers' institute. It is the high school as it were of the modern instruction of the adult farmer, and consequently we may assume something for most of those who attend its sessions.

Feeding Problems.

What are some of the points which have been developed touching the feeding of dairy cows?

1. The limitations of feeding standards are better understood and the protein statement of the German standard balanced ration is under review.

2. The home growing of adequate supplies of protein is a more practicable thing, thanks to soil if not seed inoculation with nodule-producing organisms.

3. The "best" grain feed is better known. Professor Haecker, of the Minnesota Station is emphatic in his belief that we feed cows too much protein. He shows several animals with good records which for years had eaten only 1.5 pounds of protein daily. Five years' study at the Vermont station of the relationship of varying grain rations to profit and to bovine well-being as well as a survey of work elsewhere leads me to believe that the German balanced ration's call for 2.5 pounds of digestible protein is usually an over-loud cry. But on the other hand I am not yet ready to accept Haecker's results as applicable in the East. In fact among the later conceptions of science is found the notion that feeding standards resemble India rubber rather than cast iron, that they are helpful as guides rather than as rules, and that protein is not, in the slang phrase, the "whole thing." Feeding standards are differentiated into:

1. The physiological standards, which are based on animal needs and maximum production, and are couched in mathematical terms; and

2. The practicable standards which are essentially home made, based upon and guided by the physiological standards, and which are more or less variable according to circumstances. Such a conception of the feeding standard proposition enhances their usefulness to the careful feeder.

What is the "best" grain feed for cows? There is no best expressed in terms of pounds or measures of roughages and concentrates; but there are many thoroughly good ones. If the grain ration carries digestible protein in sufficient quantity, and is made up of three or more ingredients, all palatable, none injurious to the milk and its products, and one of them at least mechanically a lightener of the ration—as for example, wheat bran or distillers' dried grains—it may be expected to be physiologically satisfactory. If then a trained judgment and a due regard to economy enter into the foundation of the ration, one cannot go far astray. Five years' work at Burlington with restricted and with heavy grain rations of many sorts, as well as the study of the results of similar work elsewhere, leads me to believe that, given:

1. A class of cows making 250 or more pounds of butter,
2. Plentiful supplies of early cut hay, carrying some clover, or if it can be grown, of alfalfa hay and of mature corn silage or apple pomace silage,
3. Grain prices as they rule to-day;

A six-pound ration of judiciously chosen by-products is in the long run as close an approximation to the best as we are likely to arrive at in this vale of mystery and doubt.

The Milking Machine.

What has research discovered of importance to the milker?

1. An apparently successful and practicable milking machine.
2. Further insight into the losses due to incomplete milking.

I saw in December, 1904, and again last Monday, a milking machine which had now been in practical operation in a large herd for about three years, with apparent success. It is also in use in several other dairies. This machine seems simple, is readily cleaned, does not irritate the cow, strips better than does the average milker, though after stripping is advisable; is rapid in its work, but is likely to prove costly in initial expense. It goes without saying that a mechanism of this kind fills a long-felt want. If ,as it would seem, its inventor can really cry "Eureka," it is a marked triumph of applied science.

I just remarked "strips better than the average milker." It is well known that the average milker gets less milk than he who does a thorough job, that incomplete milking means not only direct but indirect loss, not only an immediate lessening of the fat yield, but tends towards drying the cow. A Danish scientist has recently developed a special system of udder manipulation, a sort of massage of the mammary gland, as it were, which it is claimed augments the flow and which has a sound basis physiologically. Its conduct involves three manipulations, each thrice repeated or until no more milk is obtained; first the pressure of the quarter on each side against each other thrice repeated, followed by removal of the milk; second, the pressure of the glands together on each side, the fore quarters first being manipulated and then the hind quarters, followed by removal of the milk; and, third, the fore quarters are pressed between hand and body, the hands holding the teats loosely, then the hind quarters also, followed by milking.

Trials of the scheme made at the Wisconsin and New York stations afforded a daily average increase per cow of a pound of milk and two ounces of butter. The "after-milk" was very rich in fat, testing about 10 per cent. This after-milking takes not to exceed five minutes' time—often less than this. The two ounces of butter may be held at a low estimate to be worth two cents. This would be a fair pay for five minutes' work, 24 cents an hour and the skimmilk thrown in. Not only is more milk and butter made, but the secretion is stimulated and the lactation period prolonged. Similar work at the Vermont station following a good and conscientious milker were much less effective.

It may be remarked, however, that the differences in milk and butter yields between this method and careful stripping are not great. This Danish method, however, does emphasize, more perhaps than has hitherto been done, the actual and potential losses due to incomplete milking.

Cream Testing.

"What has science done for me?" asks the man who runs the separator.

Nothing perhaps to make his lot the easier, but something that may enable him to deliver better cream to the butter maker; for it has given him a more accurate means than he has hitherto possessed of detecting dirty milk, and of judging cream at the weigh can or on the cream route. This proposition is not a new one. It is nothing which the operator will be likely to adopt of his own initiative, for it spells turmoil to him; but some day it will come. A scheme of this kind seems more called for nowadays as a cream grader than as a milk detective. Infrequent deliveries or collections and inadequate attention given the cream at the farm make decided differences in actual butter values, differences which the Babcock cannot measure. The test is an easy one. A pink tablet of alkali dissolved in water is mixed with a small measure of cream. If the fluid remains pink the cream grades 1, being relatively sweet; if the pink hue fades out, the cream grades 2, being relatively less sweet. The two creams, for there will be many lots of each, may be ripened and churned separately and paid for on the basis of returns, or a definite and predetermined discount may be made for No. 2 cream. The system is in vogue in some creameries. It's an educator; also a trouble breeder. Keep thinking about it!

Perhaps our friend the separator operative thinks his machine takes out the bacteria. He may be excused for thinking so, for does not one of the largest of the separator companies so advertise? The solid impurities are thus largely removed, but not the bacteria, according to Iowa Station's trials in which roughly one-third of the bacteria appeared in the skimmilk, one-fourth in the cream and rather less than one-half in the separator slime. Neither was it found that the keeping qualities of either the cream or the skimmilk were at all bettered as a result. As a clarifier and cleaner in the tangible dirt, centrifugalizing milk is a success but the content of dissolved dirt and bacterial dirt in the milk are but little altered by centrifugalizing.

Extra Butter.

What aid has been vouchsafed the butter maker in his endeavor to make extras?

1. Pasteurization for butter making has been popularized and made more practicable.
2. Dairy salts have been thoroughly investigated as to their purity, their mechanical properties and their comparative values.

Pasteurization has had vogue for several years. It is no new proposition, but there have been of late some points developed on which it is worth while laying some stress.

In the first place we recognize nowadays two sorts of pasteurization as employed with dairy products, one which is designed to destroy pathogenic or disease producing organisms and one which is aimed primarily at those which impair keeping qualities. The first of these is meant to be a completed operation, the second, an incompleted one. Each has, however, a distinct and definite purpose. Now it is only with the latter that the butter-maker has to do. His subjection of large volumes of milk or cream to the influence of relatively high temperatures for a short time in some one of the many continuous forms of pasteurizer improves but does not make perfect, gets rid of many but not of all the organisms. The more modern mechanisms seem calculated rather to lessen the labor and expense of handling a given volume of product than to insure the death of all of the "bugs." For the distinct purpose in view ,the enhancing of the keeping qualities of the butter, this is probably an evolution in the right direction.

A recent suggestion from a western dairy school seems pertinent. It is that the wash water should be pasteurized. It often happens—more often than not perhaps—that creamery water supplies are not as pure, bacteriologically, as they should be, What avails it for the buttermaker to pasteurize the cream and then wash the butter in a germ laden water? To be sure he is not quite as apt to get so large a variety of posies in his bouquet as if he used no effort to improve the situation, but their numbers may be very great. At any rate, experiments at the Iowa Station indicate that the keeping quality of the butter was enhanced when the water was pasteurized as well as the cream. Filtering the water through stone, sand, coke, charcoal and gravel also helps.

Dairy salt serves four purposes in butter and cheese making.

1. It aids in the expulsion of the buttermilk or whey.
2. It augments the keeping qualities of butter.
3. It serves to promote the ripening of cheese.
4. It accentuates flavor.

Nearly a million dollars' worth of dairy salt is used yearly, most of it of domestic origin. Good salt does much and poor salt does more to affect the grade of dairy products. How do the many sorts offered us serve us?

Salt is a combination of chlorin and sodium. But all salts are not all salt. Indeed, no salt is all salt, as each brand carries more or less impurity. The average American made dairy salt carries 98.3 per cent of true salt and 1.7 per cent of impurities, of which 0.2 per cent is moisture, 0.1 per cent magnesium chlorid, 0.3 per cent calcium chlorid, and 1.1 per cent calcium sulphate or gypsum. The magnesium and calcium chlorids possess a bitter taste. In the quantities ordinarily present they apparently exert no ill effects on fresh butter, but they do sometimes damage storage goods. They seem to incite a slow decomposition of the butter fat. The gypsum is not only undesirable as a diluent but because it tends to cause salt to cake. Other things being equal, a salt that is relatively free from these impurities is to be preferred. Other things may not be equal, however, for the size of the grain, its shape, its apparent specific gravity and its solubility are important factors. The finer the grain, the greater its weight in a given volume and the more ready its solubility. Thus in a series of trials of fine and coarse grained salts, the former owing to greater solubility passed more readily out of the butter during working and proved the less economical. An ideal butter salt should be pure white, of a uniform, thin, flaky grain of medium size, without ill odor, and be nearly free from the bitter salts and dirt. An ideal cheese salt may be similarly described save that the size of the grain may be larger. No one brand stands first in all these respects. "There are others" than the one you use.

Cheese Improvement.

Wherein has cheese making practice been put upon a higher plane by scientific investigation?

1. The phenomena of the ripening processes are better understood.
2. Canned cheese, paraffined cheese and cheese prints have been developed.

The causes of the changes brought about in cheese by the process known as ripening have been in part determined within the past few years. Up to recent times hypotheses were plenty, but facts few. It was thought that bacteria ripened cheese, but the process seems more likely to be at best but in part bacterial. It is now deemed that the natural and inherent enzymes of the fresh milk,—galactase and its associates,—and the pepsin of the rennet extract, or the scale pepsin of the drug stores which is now used in lieu of rennet in some factories, are also important factors; that all three working together are probably the main ripening agents, but that the environment—particularly as regard temperature—of the ripening cheese more than any other one thing gives character to the final product.

A number of interesting points have been brought out of late which must needs be but barely referred to. The underlying reason for the hot iron test, the causes of slimy, slippery curd, of gassy or floating curds, and of "leakiness," the rationale of the quick ripening and the slow ripening cheese processes have been developed; and the relationships between temperature, moisture, varying amounts of rennet or salt, on the one hand, and flavor and texture on the other, have been determined and the causes thereof have been working out. In short the Wisconsin and New York Stations have done the cheese industry a mighty service in their abstruse, high technical work and have afforded excellent examples of the practicability of pure science.

Europeans eat cheese; Americans taste it. The consumption of cheese in this country is relatively small. It furnishes only 0.4 percent of total food, 1.6 percent of the total protein and 1.6 percent of the total fat of the average American diet. There are

several good reasons for this situation. One of them is the small proportion of the cheese made in this country which is put up in convenient form. The bulk of it, probably 99 percent, is marketed in slices, cut by the pround from large cheeses, slices which fail to keep well owing to the large surface exposed to the air. A more convenient and attractive method of marketing cheese ought to increase its consumption. Canned cheese and print cheese are two recent contributions towards the solution of this problem.

Print cheese has been made for years at the Wisconsin Station. The ordinary cheddar curd is placed in a rectangular mold and printed by pressure. Any form and size of print may be used. The Wisconsin block contains 30 one-half pound prints each 2.5″x2.5″x2.5″, the entire blocks being roughly a foot square and 2.5″ thick. It seems practicable to handle this class of cheese in the horizontal press. The print blocks cure as readily as do ordinary cheddars, develop a good flavor and texture, and may, like butter prints, bear an identifying mark which will aid in sales. Such a cheese, if of good quality, ought to sell not only because of its novelty but on its merits.

Cheese may be canned as green curd and ripened nicely in the can. At the Oregon Station two and one-half, five and twenty-three pound cheeses have been thus made which are without rind or mold, which lose no weight in curing, which after ripening keep for months, which stand shipment across the Atlantic and back, or to China and back, and open upon return in perfect condition. The cans are thoroughly paraffined within, the cheddar curd after milling and salting is either filled and pounded in and then put in press, being sealed the next morning; or, else, the curd pressed in the usual manner, is the next day slipped into big cans made to fit and sealed up. Cheese thus canned needs no further attention save the maintenance of a low and fairly constant temperature of about 60° F. A high temperature or a variable one, particularly when the cheese is young, ruins it. Some of these canned cheeses are being made today from milk which has been inoculated with sundry aroma-producing organisms. The possibility and practicability of controlling the flavor of the ripened cheese as a result of the use of specific bacteria has been demonstrated. It looks as if in the near future special brands of canned cheeses of guaranteed quality, of specific and excellent aroma and flavor, in specially labelled cans, cheeses without rind, every bit edible, well ripened, of friable texture, in short, a delicate and superior product, will be offered to the retail consumer. It looks as if this might solve the family trade difficulty and promote the use of this valuable, digestible, concentrated and under-used food.

Cheese of the cheddar or stirred curd type, dipped in paraffin at temperatures from 180-250° F., for a moment, and allowed to drain a few seconds, is coated thus with an airtight, impervious coating which lessens the loss of weight in ripening, prevents the growth of mold, improves its appearance, and lowers the proportion of rind from about 12 percent to 3 percent. So far as observed, this in no way interferes with the ripening process or deteriorates the flavor or texture of the cheese. This modification of the process seems particularly adapted to the cold cured goods which are to be the coming cheese.

The Factory.

Has science done anything to make the factory manager's job more of a bed of roses?

Not that I am aware of. It has, however, added to his information. It has shown him the injustice which he is often doing his cream patrons in not weighing the cream samples prior to testing. It has indicated some of the errors that are resident in careless methods of sample taking and handling. It has, however, for his comfort, vouchsafed some explanation of the great variations which may naturally occur in milk and in cream from the same dairy,—explanations which no doubt do not always satisfy him whose test drops, but are not withstanding fairly satisfactory explanations.

"What makes the milk test vary so?" is still a burning question, though less so than it used to be. I sometimes wonder whether it is because dairymen understand it better, or because they are hardened to it; whether more accurate sampling and testing and better informed operators and superior mechanisms have lessened the proportion of incorrect testing, or whether the judicious use of a lead pencil in the office "evens things up." I do not know; but this I do know that any intelligent farmer who wishes can own and run a Babcock and determine the truth for himself if he is careful and informed, but not unless he is careful and well informed.

Market Milk.

May market milk be bettered by aught that science has done for dairying?

Yes, for now are better understood than of old:

1. The principles underlying stable ventilation and the causes of its failures.

2. The sources whence are derived the organisms which cause annoyance, loss of products or disease; also how to avoid the damage they do.

3. The dangers of "doping."

The topic of stable ventilation is one which is often ventilated. Since much animal disease is due to or its spread promoted by the housing of cows in ill ventilated stables, it is a dollar and cents proposition to try and better this condition. Too little oxygen and too much carbon dioxide; too little air, too much exhalation from lungs, skin, manure, etc.; these are conditions which augment the growth of disease germs and impair vitality. A cow needs hourly 3,542 and a horse 4,296 cubic feet of air, amounts which fill a space ten feet high, ten feet wide and 35 to 43 feet long. Theoretically perfect ventilation is neither practicable nor necessary; but the conditions may be better in many barns.

Every barn is a problem unto itself, because of differences in shape, in distribution of contents, in contour of land in its vicinity, in the relationship of its structure to the direction of prevailing winds, as well as in the number, location and character of animals, etc. However, some of the principles which have been worked out are suggestive and helpful. These are:

1. Entrance of the fresh air near the ceiling of the stable by an indirect line, or by conduit into the barn near the cow's mangers.

2. Removal of the foul air from points near floor or near ceiling, either exit to be available as needed.

3. As straight, tall and simple a stack (ventilator) as practicable; as few angles as may be in side shafts; no horizontal lines whatsoever. In fact a good ventilating shaft should be as near an approximation to the form of a chimney as is practicable; should be airtight, should rise high above the roof, be located as near the center of the stable as may be and should have a liberal cross section. It is a good notion to sheathe a metal ventilating flue with wood and to use building paper on a wooden one. A chilled chimney does not draw well; and the chilling of a barn ventilating flue seriously impairs its efficacy.

It has long been known that the fodder and the bedding, the exterior of the cow and her milker, the utensils and the dairy, were all sources of the bacterial contamination of milk. It has been taught until recently, however, that the cow herself, if healthy, was not guilty; that her milk as it was drawn from the udder was free from micro-organisms if the fore milk was rejected. This is now known to be not quite true. She does contribute a small quota to the general assemblage; and all the cleansing of barn, and dairy, and occupants will not avail here, for we cannot cleanse the inside of a cow's udder. But we may deter almost all of the bacteria from entering the milk after it leaves the udder.

There are three ways of fighting the bacteria in milk.

They may be kept out.

They may be killed out.

They may be caused to commit race suicide.

Exclusion, destruction, isolation! All good—but the best way and one not of necessity expensive is so far as may be to exclude them.

Now I do not mean again to rehearse the story of cleanliness in the dairy. It's an old story, and folks are tired of it. I do want, however, to say a word or two about the sanitary milk pail.

Much of the dirt which gets into milk tangible and intangible, visible and invisible, that which may be seen on the cheese cloth strainer, and that which dissolves and passes through—dandruff, hairs, flecks of dried manure, bacteria and the like—fall into the milk from above during the process of milking. Now straining milk through cheese cloth only removes a part of this material. The situation can be bettered to a marked degree, the keeping quality of the milk be enhanced, and the likelihood that the milk will make good butter be increased by attention to a few details that are neither costly in money or time, nor difficult to install.

1. Wipe udder and abdomen with a slightly damp cloth immediately before milking.

2. Provide milkers with clean clothes for use at milking time.

3. Fill the seams of dairy utensils with solder and use some form of the sanitary or dirt-excluding milking pails.

There are several forms of the latter. One is a covered pail with a 4″ funnel covered with wire gauze into which fits a loose ring whereby may be fastened in a few layers of cheese cloth. Another is a closed pail with a large opening covered with a wire mesh, cheesecloth and absorbent cotton. And still a third and very practical pail is one with a shoulder and a hood, or visor, which is otherwise open. According as this is held the amount of dirt entering the pail may be cut down from 60 to 90 percent.

If now after the bacteria have been thus excluded their growth and multiplication are checked by low temperatures, one may feel fairly certain that the milk will have a lease of life almost as great as that of a ton of coal during a cold wave.

Doped milk is one of the dangers of the market milk trade, one of its great temptations. What is science's latest say-so as to embalming processes?

Dr. Wiley of the U. S. Department of Agriculture has contributed the first piece of positive information we have had on this subject. Claims and counter claims have been made as to the harmlessness or harmfulness of chemical preservatives. He, however ,is in a fair way to settle the matter by direct experimentation with his "poison squad," a lot of young men of vigorous health to whom under careful restrictions and constant medical supervision the borax compounds, common preservatives, have been fed. Without going into details it may be remarked that it has now been amply proven that considerable quantities of borax or boracic acid are inimical to digestion and to health; that minor quantities are more or less so though at times, perhaps, not injurious to healthy adults. These preservatives are undoubtedly less dangerous than are the ptomaines which may form if the materials remain unpreserved, yet they do not form when care and cold are used. Science has put its seal of disapproval on the use of preservatives unless the existence thereof is advertised on the container of the goods.

I have taxed your patience for a long time, yet I have only outlined a few of the many relatively recent contributions of research to dairying. If you would know more of them, would study any phase of the subject, ask and I will gladly direct you to literature if I am acquainted with it.

Now with what exhibition of oratory and rhetoric shall I close? A preacher having talked long and prosily to a lot of children finally said: "Now, little folks, what more can I say to you and do for you?" A little lad in the front row piped up "Say amen and sit down." Amen means "so be it;" and so most heartily to everything scientific and practicable that makes for dairy advancement say I "Amen"—and sit down.

Mr. President: The papers of Prof. Lane and Hills are now before us for discussion.

Gov. Hoard: I want to enumerate two other points that science has added for the protection of the dairyman within recent years, and those are the tuberculin test for tuberculosis which has come within the past fifteen years, and the air cure for milk fever. Whereas five years ago 95 per cent of all the cows taken with milk fever died, to-day 95 per cent survive. All this came through the earnest study of Dr. Bangs of Denmark that enables the farmer to-day to save his very best cows which formerly used to perish with almost unerring fatality.

President Armsby: I cannot quite resist the temptation to blow our own horn on the

matter of tuberculosis. There may be some who do not know that the first herd tested in this country for tuberculosis was tested by Dr. Leonard Pearson, on a well known herd in Philadelphia, and the first comparative demonstration made by any experiment station in this country, so far as I know, was made by the station in the succeeding year.

Mr. Hills: There are more tuberclin tested cows in the state of Vermont than in any other two states in the Union.

Mr. Norton: If they wish to take up the discussion, I have three or four resolutions; also to make a report of the Committee on Nominations.

RESOLVED, That the Dairy Union of Pennsylvania wishes to record as its earnest conviction that the Dairy Division of the Department of Agriculture at Washington should be advanced to the dignity of a Bureau. The great value of the dairy production of the United States demands that such standing be given to this industry in the Department at Washington. We ask our representatives in congress to work for such a consummation.

Chairman: You have heard the resolution. What is your pleasure?

It was moved and seconded that the resolution be adopted. Unanimously carried.

RESOLVED, That the Dairy Union of this State desires to express its high appreciation of the work done by the National Dairy Union in its fight with the fraud Oleomargarine. We believe it to be the duty of every creamery man in our State to contribute financially to the support of the National Dairy Union. Let every dairy farmer in the State write his member of congress, as well as the U. S. Senator in support of this work.

Moved and seconded that the resolution be adopted. Carried.

RESOLVED, That the Pennsylvania Dairy Union hereby endorses the bill (H. R. 345) introduced in the House of Representatives by the Hon. H. C. Adams, of Wisconsin, to increase the national appropriation to the Agricultural experiment station, and requests the representatives of Pennsylvania in the Senate and House to use their best efforts to secure its passage.

RESOLVED, That the Secretary be instructed to send a copy of these resolutions to the Hon. H. C. Adams, to the Hon. James Wilson, Secretary of Agriculture, and to each senator and representative from Pennsylvania.

Moved and seconded that the resolution be adopted. Carried.

The Chairman of the Nominating Committee made the following report: President, H. E. Van Norman, State College, Pa.; Vice President, Thomas Sharpless, West Chester; Secretary, W. E. Perham, Niagara; Treasurer, M. E. Reeder, Muncy; Board of Directors; J. H. Reichert, Scranton; M. P. Shoemaker, Greensburg; H. W. Fallsington, Comfort; J. W. Detrich, West Chester, and Henry Palmer, Avondale.

It was moved and seconded that the Secretary cast the ballot of the Union for the candidates. Carried.

The Secretary thereupon reported that he had cast the ballot for the foregoing nominees, and declared them elected.

The Chairman: Is the Auditing Committee ready to report at this time?

The Chairman of the Auditing Committee: The Auditing Committee have made a careful audit of the accounts, and we find that up to this morning the receipts amounted to $263.70, and the disbursements, $261.07, leaving a balance in the hands of the Treasurer of $2.63.

It was moved and seconded the report be received and filed. Carried.

Dairy Legislation.

Gov. Hoard: I am exceedingly interested in your success in legislation, and I hope you will not think I am conceited if I give you a little experience. A gentleman here says it is very difficult to get anything here in Pennsylvania, for the farmer or dairyman. I say to you that you are to blame if that is the case. You can teach the politicians of Pennsylvania just the same lessons that have been taught them in other states in the nation. You have got votes enough in Pennsylvania to make your voice heard when you make your influence potent. When the National Dairy Union grappled with the proposition of passing certain legislation, and I happened to be president of that body, spending three years, nearly, in Washington, and over $1,500 of my own money, we had scarcely any funds to do business with, with which to cope with the $150,000,000 of capital and the large corporation pool in Washington. What did we do? Instead of moving on the politicians and upon members of congress by our own appeal, we spent a large portion of that fund in double postal cards, on one half we said in substance what we wanted to say on the other half in his own writing. I tell you ,we snowed Washington under with postal cards. We pursued the same course with such men in Wisconsin, men who thought their constituency could not be rallied against them. I want to tell you we made those men get down off their high horses, and do business very quickly. It is astonishing what a few letters and postal cards and a few direct appeals to men in legislation will have. Resolutions may be resolved until the cows come home. You may resolute and resolute, and petitions may be circulated, and the average legislator with some other influence behind him will turn a contemptuous nose on the whole proposition, but a direct letter from one of his own district, or a postal card, a clear straightforward statement that we want so and so, and if we do not have so and so, we will hold it in remembrance, has a great deal to do, and has a most potent effect. I advise you dairymen all over the state of Pennsylvania to become enthused with this idea.

President Armsby: I might say for the information of our friends from other states that this personal appeal through letters to members of the legislature has thus far brought a total appropriation for agricultural and educational work of a little over $200,000. Personal letters did it, and will do it every time.

The Chairman: If there is no further business a motion to adjourn is in order.

Motion made to adjourn until 7.30 this evening, when a joint session will be held with the Pennsylvania Live Stock Breeders' Association will be held.

Motion carried.

EVENING SESSION

Joint Session of Pennsylvania Live Stock Breeders' Association and Pennsylvania Dairy Union.

Meeting called to order at 7.30 by President Armsby.

The Chairman: Is there any unfinished business to be taken up?

Mr. Reichert: I believe, Mr. Chairman, some of us who have attended meetings in recent years feel that some one is deserving of a great deal of credit for the splendid turnout we have here to-day, and I feel that a vote of thanks is due Mr. Bayard of the National Stockman as the person who deserves the greatest credit. I desire to make a motion that a vote of thanks of the Association be tendered Mr. Bayard.

Motion seconded and unanimously carried.

President Armsby: I want to add my personal thanks to Mr. Bayard for the very cordial and generous way in which he has relieved the officers of the Dairy Union of the duties which properly belong to them, and of the efficiency of the arrangements that we have had for this meeting. Those in favor of this vote of thanks say aye. Unanimously carried. (Applause.)

Mr. Norton: I think there should be a committee of three appointed in reference to the Grout bill, and therefore I make a motion to that effect that this committee, to be appointed by the Chair, to consult with other allied organizations, and to take up this question of the fight of the Grout bill. I leave the appointment of the Committee with the Chairman.

Motion seconded and unanimously carried.

Prof. Van Norman: I have just had a talk with some of the gentlemen in regard to state appropriations. I want to ask whether the matter is in the President's hands, or in the hands of the board of directors, or whether any action should be taken here instructing them to look after that in the future.

President Armsby: The directors represent the Union between meetings. It is perfectly proper for the meeting to instruct the board of directors.

Mr. Norton: I think the board of directors are supposed to look after the interests of the Dairy Union and I should think that would come under the head of looking after these interests. I do not believe that needs a special committee, but if they want the endorsement of the meeting, whether to go ahead and do that, I do not believe there is a man in this room but who is in favor of their asking for the appropriation at the next session of the legislature.

The Chairman: We will now listen to the Hon. N. B. Critchfield, Secretary of Agriculture, who will give us a short talk.

REMARKS OF SECRETARY CRITCHFIELD

Mr. Chairman, and gentlemen of this Union meeting: I went to a great deal of trouble to get here this evening. I have been very busy for the last few days, and it was quite an undertaking for me to get here at all, but I wanted to come, if I could only be present at this joint session, and in order that by my presence I might be able to assure you of the personal interest that I feel in the work you are doing, and the interest that the Department of Agriculture of the State of Pennsylvania feels in what you are doing, what both these organizations are doing for the agriculture of the Commonwealth of Pennsylvania. There is another reason, Mr. Chairman, why I was especially anxious to be here to-night, and that was in order that I might have the pleasure of meeting, and not only meeting but hearing, the distinguished gentlemen whom you have brought here from other states. So I say it is a pleasure to me to be here.

The work that you are doing in both these associations is very nearly related to the work that is being done by the Department of Agriculture of the state, and especially is that true just now. You are engaged in the improvement of the dairy interests of the state as well as the live stock of our commonwealth, and our department has been engaged, for the last few weeks especially, in the work of trying to provide better feed upon which the live stock of the commonwealth shall subsist. You may know something of what we are doing if I tell you that since I left the state capital on Monday evening I have attended no less than fifteen hearings, that resulted from prosecutions brought against persons for a violation of our feeding stuffs law. This work of prosecution was delayed for a while for the reason, for two reasons, I may say; 1st, because we did not feel like entering upon it until we had our chemical laboratory thoroughly established, and well equipped at the state capital, so that there might be constant intercourse between our chemist and the head of the department; and second, for the reason that some changes were made in our feeding stuffs law by the late legislature, and it was thought proper to give the people an opportunity to obtain a knowledge of the law. The application of the term commercial feed stuff by the last amendment was extended, and liabilities of dealers were increased considerably. In order that some people might have some knowledge of the law before prosecutions were begun we determined to wait until three months had elapsed, and during those three months we were trying to inform the manufacturers and dealers throughout the state of Pennsylvania what the requirements of the law are. Printed copies of the law and the amendment thereto were sent out to all the dealers whose addresses we could secure, and circulars explaining the law were sent to all the newspapers of the commonwealth with the request that they be published for the information of the people, and it was determined that prosecutions should begin, in fact, Mr. Chairman, we hoped by publicity perhaps we could do away with the necessity of any prosecutions, but we determined if giving publicity to this matter would not do away with the necessity of prosecutions, they should be begun soon

after the first of August, and we would begin to prosecute wherever we found violations of the law by dealers from whom samples were taken in the first of August and afterwards. And we have had quite a number of them to bring, so we have been very busy, and in this work I say we are working especially along the same lines that you are working.

Now, I did not expect to make a speech when I came here. In fact, I am not a speech maker, but before leaving the floor I want to congratulate the members of the State Live Stock Breeders' Association and members of the Dairy Union upon the excellent prospects that seem to be before you. I do not know that there was ever a time when prospects for the men engaged in rearing live stock, and especially breeding the better class of live stock, were better than at the present time, and you know the market, the market price for dairy products, has been holding up remarkably well during the past year. There has never been a time since the creation of the Department of Agriculture when there was such a very great demand for licenses to manufacture and sell oleomargarine and renovated butter as there has been within the last few weeks. Now, we do not care about seeing very much of this stuff manufactured or placed upon the market, but our law provides it shall be done if it is done according to the laws of the commonwealth under a license that is granted by the Department of Agriculture, and the reason why I mention this is an indication that the price of dairy products is holding up well. The people who manufacture these imitations of dairy products, of the genuine article that is manufactured at the creamery and upon the farm, are wide awake people, and they would not be asking for a license to engage in this business unless they felt there was a very good prospect before them.

With regard to the live stock interests, it seems to me that the prospects for the future are very flattering indeed. The year just closed has been one of the best years that I have known during the period since the time immediately after the Civil war. The live stock sold in the city of Chicago, and what is done in the city of Chicago, by the way, is a very good index to what is done throughout the whole country so far as the live stock is concerned, the live stock that were sold in the city of Chicago during the last year were sold for $36,400,000 more than was received for live stock during the year preceding. That is certainly a very large increase. The demand for horses, especially, has been remarkably good during the last year. Those of you who have been watching the market have not failed to see that good driving horses, horses well mated, well bred, well trained, that have good style and good action, have been selling readily from eight to twelve hundred dollars per pair, and the same improvement is true of heavy draft horses. So that those of you who are engaged in raising horses have a very excellent prospect before you. And the same is true of the cattle trade. You have noticed, perhaps, as I have noticed, there is an inclination in recent years towards the purchase in our market of what is called baby beef, cattle being slaughtered younger than they used to be, and this perhaps is owing to the fact that we have a large population in our cities who want a good home dressed beef that is reasonably tender, without knowing that it has been placed in cold storage and ripened for two or three months before it has been placed upon the market. This, no doubt, is one reason why we have this demand. Another reason, perhaps, is found in the fact that they have come to understand better than they have done in the past, that the most money is made in feeding stock, by getting it into the market just as early as possible. The young animals are growing, you know, much more rapidly, and much more weight can be made with the same amount of feed given to a young animal than given to one that is older. You take, for example, a calf that weighs 100 pounds at the beginning by careful attention and proper feeding the weight can be increased from eight to ten hundred pounds the first year. Every one knows if that calf goes beyond 400 pounds in the increase in weight of the animal for the second year, it is doing very well. We all know that much larger amount of feed is consumed the second year than the first year. The older the animal gets, until the period of growth is ended, the less will be the increase in weight, and after the growth of the animal has been completed the gain will be still less. So the feeders have come to understand that if they want to get a good price they must get their stock into the market just as early as possible.

Now, the point to which I wish to come is, that these ends can be secured only by having the best stock to begin with, the best blood, and hence I say there is a very bright prospect in the near future for those of you who are engaged in breeding, in producing the very best stock for breeding purposes.

Now, Mr. Chairman, as I said at the outset, I do not expect to take much of your time. I know that you have your programme and that every moment of your time is precious. But it has afforded me great pleasure to look in upon you, even though it be for this one session only. I must return tomorrow to the work at which I have been engaged, attending hearings in other parts of the state, so that I only hope to be with you at this session, but I am very glad indeed to have been here, and it has been an inspiration to me, it is an inspiration to me, to look into your faces and to see men such as I see before me, earnestly engaged in the work in which you are engaged. I will return to the work of the department better qualified for that work because I have had the opportunity of meeting with you here. I thank you for your attention. (Applause.)

The Chairman: There can be nothing more important I am sure to have all the various agencies for the promotion of agriculture in our commonwealth working in harmony, and it is especially gratifying therefore to hear these words of inspiration and sympathy from the Secretary of Agriculture.

The Chairman will announce as the Committee on the Grout act to confer with similar committees. W. C. Norton, Thomas Sharpless, M. P. Shoemaker.

Now, gentlemen, I will ask the President of the Breeders' Association, Mr. W. C. Norton, to take the chair for the remainder of the evening.

President Norton: The first thing on the program will be an address on "Alfalfa in the East," by Willis O. Wing, of Ohio.

ALFALFA IN THE EAST

Willis O. Wing, Mechanicsburg, O.

Mr. Chairman, and Gentlemen: It gives me great pleasure, and I feel it is one of the great honors that has happened to me, to talk to a body of men like this. I have attended a few meetings, and I do not think I ever looked into the faces of as able a lot of men. I want to say right now, gentlemen, that I am not a speaker. My brother is the speaker. I have just come down here to tell you a few truths about the alfalfa plant. I will try to confine myself to the truth, and maybe if you do not get a literary treat you will get some real good out of it.

Gentlemen, if you went into a field of clover and you knew that it represented eight tons to the acre; if when you got through cutting your oats and piling the sheaves, you knew that it represented 160 bushels to the acre; if when you looked at that field of corn, you knew that it represented 120 bushels—as we speak of bushels in Ohio—if you approached crops like that, that meant that amount of wealth, and it had been established by the traditions of your state and your farm, when you approach a crop like that, then what would your feelings be? Gentlemen, that is the sort of crop I have to present to you in the crops of alfalfa. Now, those sound like strong figures, but let me make that a little clearer. We raised there at home on our land about four tons average per acre on about a hundred acres. We raise no better than our neighbors, not as good as some a little ways off from us. We are able to trade this alfalfa very nearly pound for pound for ear corn. Figure for yourselves, and see how much corn I can buy with an acre of alfalfa. I can buy just about two acres of 60 bushel corn as we speak of corn. You may say that this alfalfa is a new crop, that it may have this value now, because we have been able to dupe some people into buying it. But I want to say to you that alfalfa has an intrinsic value. I have heard it said of spring barley that it is meant to sell and to start alfalfa with. Alfalfa I would say has an intrinsic value. I will show you it has an intrinsic value when I come to measure it. I was talking with a man this morning who raised this year probably 200 tons of this hay. I asked why he didn't sell it and buy some clover to put in the place of it. He said, "No, I wouldn't care to do that. I wouldn't make anything by it." I don't know of any fellow who is a closer figurer than your hired hand. One of my neighbors recently had a hand. He said to him, "If you want some hay, I have some clover hay which you can have at $6 a ton, and I have got some alfalfa which you can have for $12 a ton." The hand said, "You don't fool me, I will take the alfalfa." He would have been inclined to take the clover if he hadn't thought he was going to get a little more than twice the value. I wouldn't let a man bring to me two tons of clover and take away a ton of fine alfalfa hay for a fattening ration.

Now, if you will look at the values according to the analysis, they wouldn't be in that ratio, but in a fattening ration I want to call your attention to one thing. A food that has $4 worth of food value to the ton to my notion would not be worth much more than half as much as a food that had $6 worth a ton. I don't know, it may be a little bewildering for me to present that in that way, but now, for instance, alfalfa is given at about $9 when clover is worth about $6. But in a fattening ration I don't believe that will work out. As a maintenance ration, I think that perhaps it might if they are equally good. The point I am trying to make is the ration of lower value burdens the animal. For instance, corn fodder would show an amount of food value probably say three dollars a ton, but you could not fatten an animal if you were to give him ever so many tons of corn fodder. You could not give him enough pounds. I think you get my point.

Alfalfa has a fertilizing value. It has a mechanical value as a sub-soiler. The roots go way down there, maybe six, eight, ten or twelve feet. I have seen them five feet the first year's growth. When it is plowed it leaves that soil with little capillaries running down. It has a value in that it adds some organic matter as the clover root does. It has a value as a nitrogen gatherer with all of the other leguminous plants. I suppose that from an acre of alfalfa, from what the dean over at the university said the other day, if you fed the stuff back on to the land, and would add to that the nitrogen of the air that you get from an acre of it, you would put on to that soil about $25 worth, taking it at the price at which you buy nitrogen. We have fed this hay to lambs. We fed 1,400 lambs and 100 head of fine sheep at home. I will say to those of you who are lamb feeders I have been able to double the weight of the lambs in a period of six months' feeding about two bushels of corn, and what alfalfa hay they would consume, and when I say consume I mean practically all of it, because we throw out nothing from the racks but some stalks.

Now, then, I come to the question whether alfalfa can be grown in Pennsylvania. I want to say for your encouragement that some who have tried it in Ohio failed. One of the men over there who tried it was at the college one time, another was at the State Experiment station, and all the agricultural papers and lots of our neighbors said, "Well, now, you can't just grow it. That is all there is to it. You might just as well shut up. You can't grow it here." They said it wasn't the natural place for the plant. But we are growing, within a radius of fifteen miles of our home, a matter of three thousand tons this last year. We fooled with alfalfa for a matter of ten years, and were very much discouraged, and I want to say to you, you find out one thing if you have ever tried it on a piece of ground and did not succeed and plow that up and re-seed it, you will find it succeed much better than the first time. That is practically on account of three things, one of which, there is something in inoculation, and there is added some fertility; and further, it has put the ground in better mechanical condition for the following crops. Now, then, I would say to you that where we are growing it in Ohio we are growing it on a variety of soils in the glacial drift—I don't know that the glacial drift has any peculiar significance—but we are in the glacial drift, and we thought at first it was best on alluvial soils, and tried it on alluvial soils; and then we thought we could do better on gravelly soils, and we have finally come to grow the best alfalfa.

on heavy white clay lands, and on yellow clay lands, lands that were formerly considered pretty poor lands. But there is where it is doing the best to-day since we have got stands of it. You cannot grow alfalfa, to begin with, on a shallow soil, that is a soil where it is only twelve or fifteen inches to the bed rock, in our country, for the reason that it will freeze out in February and March, it will heave out of the ground, but there are not, I suppose, very many soils like that in your state. Mostly you would have a depth of from three to eight feet. We grow it on even pea soils there at home with the addition of some muriate of potash. My brother told me that the keystone of the situation in Pennsylvania is lime. I do not know that it is, but if you put lime on I wouldn't fool with it, I would put enough on. It is not very expensive, and put on about 300 pounds to the acre, and put it on in almost any form.

Now, then, to come right down to alfalfa. To grow alfalfa in any state there are two or three things that are necessary, and one is a dry soil. To grow alfalfa successfully on my farm we had to put in 320 acres about 14 miles of tile drain. That is a synonymous term for sweet soil, and it is not sweet everywhere. You must have a sweet soil, and the lime will make it sweet if it is acid. Last, but not least, you must have some humus in that soil, and preferably some manure on the land. Now, I do not mean by that you must always have a rich soil. We have alfalfa growing finely on land that was just a white pipe stem clay, but we stimulated it. First we coated with manure, we stimulated the plant until the roots get down to the subsoil.

A Member: How long do they stay on that soil?

Mr. Wing: Twelve years. That is, possibly getting better up until about the eighth year. Now, then, about our process of seeding. We plow the ground early in the spring, or late in the winter if we can, and plow it a little deep so it will turn up some fresh dirt. Then early in the spring as we can work the land we go in there and seed the ground nicely with seed, about 15 pounds of alfalfa seed, and about a bushel of beardless spring barley. That is what it is useful for, to give a stand of alfalfa, and it is the best nurse crop.

A Member: Why not any barley?

Mr. Wing: I am not acquainted with other barleys, but this beardless spring barley is short strawed, early maturing, beardless, matures with wheat. The other method would be to seed without a nurse crop, except if you are pestered with crab grass. Do you know anything about crab grass in this state?

A Member: Yes, have some in the eastern part of the state.

Mr. Wing: Where you are bothered with that plow as suggested early, and disc along until say June or July even, and then seed at the rate of fifteen pounds per acre by itself, or if you had a season like this season, I wouldn't see why you couldn't plow up a clover field or oats stubble and seed after those crops. Whether you seed with a nurse crop or without it will be necessary the first year to clip the weeds off if the weeds appear. Rake them off. The first year it won't look like it is going to amount to anything. When the fall of the year comes around do not be tempted to pasture it the first fall. Let it have all its growth, it will be much stronger, go through right the next winter and next year the hay will pay you for keeping the stock off that first year.

Another word about seeding. In selecting your seed, darker seed is an indication that the seed is heated in the stack or after it is thrashed or some time. Select the bright yellow seed and if a few green seed should appear in it that does not hurt. It merely signifies that the seed has been grown in the northwestern rather than in the southwestern part of the country, and the notion is the northwestern seed should be the better seed. I do not think you will notice any difference, but it is just as well to be on the safe side.

I have got conceit enough to think I can come here into Pennsylvania and raise alfalfa. I may be wrong. Now, I just want to tell you a little bit of what alfalfa has done there at our place. About fifteen years ago the gross receipts of our farm were $800. When we started to feeding lambs we were able to fatten there about a single deck load. Then we got a double deck load, or about 250. After we fed the 250 we carefully saved all that manure and put it back on the place. This winter we are feeding 1,400 lambs and a hundred head of fine sheep, and cows and horses that go with the place, on the same amount of land that fifteen years ago produced a net revenue of $800. In addition we have sold 150 tons of hay off the place. If you desire to ask any questions I will gladly answer such as I may be able.

A Member: Can you tell us anything about alfalfa meal, manufactured as concentrated meal?

Mr. Wing: I cannot tell you anything you probably do not know now about alfalfa meal.

A Member: You say your lambs doubled in weight?

Mr. Wing: Yes.

A Member: How heavy are they when you get them?

Mr. Wing: From 42 to 52 pounds.

A Member: Have you had any experience with the so-called alfalfa culture?

Mr. Wing: We believe in inoculation. But it does not sound reasonable to me, gentlemen, that if you had a piece of land with all the life out of it that you could inoculate that soil and expect the bacteria to live. What is the best place to make them thrive? Disease bacteria thrive where there is some filth, and I believe that if you would thoroughly manure the land where you intend to raise alfalfa the bacteria will ultimately take care of the situation. You will introduce a few with the seed. However, if you want to inoculate that soil, I do not think you can hurt it at all. I believe that you would get pretty close to the same result without inoculation if your soil had been manured. Where it was manured I never failed to find them almost at once, and quantities of them.

A Member: Did you ever inoculate the soil by introducing soil from other fields?

Mr. Wing: No sir, when we commenced growing it out there at the farm there was not much said about inoculation. I think if we had known more about it at that time perhaps we might have been benefited somewhat, but we didn't have the amount of stable manure then that we have now; nor did we realize the importance of it.

A Member: How many crops do you usually aim to get without plowing up and reseeding?

Mr. Wing: I am trying now to get the farm into a systematic shape. I follow corn with corn. This year I got 72 bushels of corn (144 measured) on the alfalfa side, and 68 bushels on the old ground. So it is two years in corn, and then a year in barley and alfalfa, and then three years more in straight alfalfa. This makes a six-year rotation.

A Member: Do you cure your hay under caps?

Mr. Wing: No, sir, we haven't got that far yet.

A Member: Tell us how you harvest it.

Mr. Wing: It is pretty hard to describe. The weather enters into it so much, the conditions vary so ,but I prefer to make it mainly in the swath, that is the first crop. But you might have to let it lie a couple of days if you are having bad weather, and just as soon as it gets dry for half way down, start the rake in there and rake it into small winrows and turn the green side up. When that green side is dried properly, get it into the shock. Putting it into shock depends upon the weather. Sometimes be ten days or two weeks before we get it into the barn.

A Member: You mean let it wilt and pile it up?

Mr. Wing: After you come to throw it out it seems like it gets in a sweat and loses moisture very rapidly. On the second and third days it is a different proposition, about such a proposition as to make clover. We don't use a tedder for the reason that the leaves come off very readily. I believe there is a form of tedder that won't do that, but the old fashioned kicker that we had would knock the leaves off.

A Member: Do the roots bother the tile drains?

Mr. Wing: Yes, if you get tile running through your field, that is a field with running water throughout the entire growing season, it will be better to leave that strip of ground over the tile without any alfalfa. We had a hundred yards of tile filled. We have about 14 miles of tile there on that farm, and that is all the tile that has ever been bothered, but most of them during the summer months are empty.

A Member: Would you advise paying $20 a ton for the alfalfa meal?

Mr. Wing: No, I do not believe I would. What would you want to use it for?

A Member: Feeding dairy cows.

Mr. Wing: I do not believe there would be any advantage to dairy cattle to have it ground. Your dairy cattle will eat it all.

A Member: It is not on the market in any other form.

Mr. Wing: No, sir, unfortunately it is not on the market very much yet, but it will be. I believe that Ohio is going to raise a lot of alfalfa hay.

A Member: Would you pay $20 for it if bran was the same price? And if the alfalfa were put in the same mechanical condition that the bran is in, would it, in your mind, be a substitute for bran?

Mr. Wing: Yes, I would not hesitate to say that alfalfa will make a substitute for bran. I will tell you what I base my assumption on. One or two years we fed lambs on shredded fodder or with clover hay and bought bran, and my bran bill was something huge. I gave them what bran they would consume. Also I have had quite a little experience feeding bran to our fine sheep, and we just about get our bran bill out, and my gains with alfalfa and no bran are as good to-day as they were ever, I don't know but a little better.

A Member: The advantage of grinding the alfalfa is to put it into the same mechanical condition that bran is in, and to save the cow that work.

Mr. Wing: The cow hasn't anything else to do. I would think it would be cheaper to buy the hay.

A Member: If you could get hay and bran at say $20 a ton and ground alfalfa at $20 a ton also, which would you take?

Mr. Wing: Well, that would depend a little on the kind of alfalfa that was ground. If it was damaged alfalfa I would prefer the bran.

A Member: Supposing it was first class.

Mr. Wing: According to analyses there is not very much difference, and according to my own experience in feeding there has not been a great deal of difference.

A Member: You mean alfalfa hay ground up?

Mr. Wing: Yes.

A Member: Nearly equal the wheat bran?

Mr. Wing: Yes.

A Member: Is that the whole stalk or only the top that is ground?

Mr. Wing: The entire plant. My lambs do not discriminate about stalk as they do about the clover. I will give you an illustration of the value of alfalfa. We have some clover this year on some land that we bought that we thought was not rich enough to raise alfalfa on, and we had been feeding that clover to one bunch of lambs; two other bunches of lambs were fed on some very badly damaged alfalfa. We had a great deal of rain at the time of the first batch of hay last season, and the alfalfa stood there in shocks until when I went to open it out it smelled, and there were traces of mildew in it, and it looked like manure when it was wet and soppy. I felt pretty blue. We had probably 45 or 50 acres of hay in that condition. But we opened it out and got it dry, and it looked better ,and I put the best of it in the barn and the worst of it in the rack. I have been feeding some of the worst of that hay to one bunch of lambs, and some pretty good clover to another bunch up to the first of the year. With the clover-fed lambs I had my brother feed all of the corn they would take in the ten weeks, and now, we didn't weigh these lambs when we put them in the feeding, but if you know the western lambs you will know they run uniform. The alfalfa-fed lambs were about 5 pounds heavier than the other lambs that had all the corn they would consume.

A Member: Without corn?

Mr. Wing: Without corn and with damaged alfalfa. That on my bunch of lambs means over $500 if it had been fed throughout. They ate that damaged alfalfa almost all of it, threw out very little. And with alfalfa hay, as we ordinarily raise it, we do not throw out anything and make good gains. I think any of you will concede that.

A Member: Do you know how much a lamb gained in the ten weeks?

Mr. Wing: Well, in the ten weeks they gained one bunch about five pounds I assume, and the other ten pounds. The first period, you know, frequently up until Christmas, we do not expect to get much if any gain at all. We get the weak western lambs, and then after that period you begin to get the gains, after they get a good start.

A Member: Starting an alfalfa field in Pennsylvania the first year seems to be a general failure. Would you put it right back on the same ground and inoculate?

Mr. Wing: Let me give you another suggestion. I have talked to a number of you. Why don't you mix your clover and alfalfa say half and half for a year or so? That will help to inoculate and there would be something to do, and they don't quarrel at all.

A Member: Do you use commercial fertilizer?

Mr. Wing: No, haven't used over 4 tons in fifteen years on the farm.

A Member: Do you use common clover as a nurse crop?

Mr. Wing: No, I wouldn't. For a nurse crop I said we had barley the first year, and seeded without a nurse crop along later in the summer after discing the land.

A Member: Do you sow on a wheat field?

Mr. Wing: We sow every way. You can sow on a field such as a wheat field and your land should be plowed preferably, and it must be disced. The seed must be put in the ground.

A Member: How do you sow it?

Mr. Wing: We ordinarily sow with a drill and let it go in front of the drill hoes. Just put it in the grass department and let it go in front of the drill hoes so it will become covered slightly.

A Member: Do you pasture?

Mr. Wing: Yes, we pasture it with all kinds of stock. There is a little danger in pasturing cattle or sheep. It may be done, but I think here in Pennsylvania you would be safer to soil with the cattle and sheep. They are pretty valuable here. With hogs or with horses there is no danger. I wouldn't pasture at this stage very much while you have the difficulty you now have in starting it, because the tramping of the ground is not good for it. It will not do at all. I believe I wouldn't pasture very much until you get a better stand.

A Member: Do you allow the nurse crop of barley to get ripe?

Mr. Wing: Yes. Sometimes sow oats and cut that for hay, but oat hay is one of the hardest kinds of hay I know of to cure; it is likely to be neglected and if it goes too long it will not do right. I believe I would just use that barley first, or else cut out the nurse crop.

Alfalfa in Wisconsin.

Gov. Hoard: Gentlemen—This alfalfa question is a great big one. I have been growing alfalfa in Wisconsin for ten years. Indeed it might be said like Mr. Wing that I was the pioneer of it in that state. It had been tried in a fugitive way here and there by men who said it could not be grown. I found on a farm that was near me roots that were thirty years old. I thought that would answer sufficiently. I believed I could grow alfalfa if I knew enough about it. I readily saw that in that climate it had to be handled with peculiar understanding. For instance we get the mercury 40 degrees below zero. I took about 25 or 30 city lots, varying in all kinds of soil from a blue clay residium sub-soil, black soil, up to sandy soil. Heavy clay, clay 30 feet deep, tried all kinds of soil, and had a great many failures, and welcomed every failure as much as I would a success, because it taught me as much, and I finally succeeded in formulating a method which I want to say has proved eminently successful. Prof. Henry at our experiment station said, "Hoard, I don't think you can succeed." The whole of the agricultural college thought I couldn't do it, but I did it. The result of it is I put 180 tons in my barns last year ,from 35 acres of land.

Now, a few things about what I do with it. For instance I was feeding ordinary hay to my herds of Guernsey cattle and eight to ten pounds of Ajax flakes and bran with 35 pounds of good field corn ensilage that would go from 90 to 100 baskets to the acre. When I put my cows upon alfalfa hay, ten to twelve pounds, they continued in that way for two weeks. They increased their milk flow and I put the manure under a magnifying glass and I made up my mind I was throwing away grain. I reduced the grain ration, and the milk flow held; and I reduced it until I cut the grain ration squarely in two, and it saved me 50 per cent of my grain ration. It is worth that much in making milk. So that 35 pounds of good field corn ensilage with the corn in, and ten to twelve pounds of alfalfa hay, particularly if it was the second and third cutting, will almost complete the ration, needing say about 3 pounds of bran and a pound of gluten or three pounds of bran and two pounds of ground barley to the cow. Now, those cows did this last year. The whole herd averaged, and they were not fed any more than from the 15th of May until the 15th of October, they averaged 6,750 pounds of milk, and made within a fraction of 400 pounds of butter per cow. That was the result of feeding 35 pounds of ensilage and 10 to 12 pounds of alfalfa hay, and the ration of grain I told. It cost $32.60 per cow and the $6 a year for the pasturage.

For Horses.

Another thing I do with alfalfa. I have three field teams of horses. I fed the alfalfa hay, first cutting, just the coarsest, for the winter keeping of my horses on eight ears of corn a day. My horses are fat on 12 pounds of alfalfa and eight ears of corn a day. So much for horses. My brood sows from the time they are served until the time they farrow are fed on nothing but their drink and alfalfa hay. A party of gentlemen from the University on Saturday last came over from the classes and they said to me that they had heard that I kept my brood sows on alfalfa hay during the period of gestation, and I said yes. "Well, we would like to see the hogs." I took them into the hog pen and showed them the sows. And they looked at me in blank amazement. "Why," they said, "these hogs are in good condition." "Yes." "And they get nothing but alfalfa hay? "That is all the nutriment they get except their drink."

A Member: Was that hay cut?

Gov. Hoard: Yes, sir, second and third cuttings.

A Member: What kind of drink do you give them?

Gov. Hoard: Their drink is mostly water, no whiskey I assure you. It is rarely ever they get milk—28 calves taking the skim milk. But you will be perfectly amazed, you can keep hogs all winter on nothing but hay and what water they need.

A Member: Do you cut the hay? Steam it?

Gov. Hoard: Io, I don't cut the hay, only cut it in the fall.

A Member: Do not chop it?

Gov. Hoard: I steam it, throw it into those hogs; as the old Irishman says, "Indade, man, but they ate it like a baste."

Hogs and Alfalfa.

Now, this is what led me to do that thing. I ran across a bunch of hogs in Colorado that weighed 178 pounds per hog when they were eleven months old. After they were born they staid with the mother five weeks; then they were turned on to alfalfa pasture, and the little things, as they were, went to grazing on alfalfa. They were wintered on alfalfa, and sold when eleven months old weighing 178 pounds apiece, never saw a spoonful of grain in their lives. They were wintered at an alfalfa hay stack. I said to myself, there is something in this thing. In the west we had a great deal of trouble with our sows. In farrowing the pigs would come weak, lose a good many pigs, and we grow an abundance of corn there, and do you know, corn is one of the most deluding and debauching things in the world. Well, now, then, I reasoned that the difficulty with these pigs is that the mothers did not get protein enough to make those little bodies during the period of gestation, and the result of it was that when they came they were deficient in strength and vigor. The first time I tried this system of feed in the brood sows on alfalfa hay was five years ago. My foreman, when I went to Texas—to El Paso to spend two or three months—the foreman was just frantic about it and he says, "I hate to let you go off with such an order that I cannot feed those hogs any grain." "Well, now," I says, "I am going to stick right to it. I don't want you to feed them a spoonful. I don't care if I lose the hogs, I want to know about it." "Well," he says, "they will be perfect skeletons, I know it." A month rolled by and he wrote me "The hogs are not losing in weight." The next month came by and he says, "I think the hogs are gaining a little." I was suspicious. I wrote back to him, "Are you feeding any grain?" "Not a spoonful. I was stuck to what you told me." The pigs came and nine brood sows brought me 78 pigs, 75 of them I saved. The same sows farrowed again in the fall and having been fed on alfalfa during the summer they brought me 54 pigs. Three of them were lost by being laid upon, and not a weakling in the lot. And from that time on I have never had a single weakling pig where the sows ate alfalfa and were kept on alfalfa during the period of gestation. It is one of the most wonderful plants I have had any experience with. We found that the old monks a hundred years ago at Pueblo planted alfalfa and I have seen the roots which the people say were from the same old roots that were planted by the monks, and still it is just dawning on the intelligence of you and me. This plant called alfalfa was known to the old Germans under the name of Lucerne. They abandoned it when they came to this country. In Jefferson county where I live eighty per cent of the people are German. I got hold of an old German one day and asked him if he knew anything about alfalfa in the old country. He said they did not. I asked them if they did not know about Lucerne? "Sure, we know about Lucerne." I asked them if they ever grew it in the old country and some of the old men said they had grown plenty of it. I asked them why they didn't grow it here, and they said it wouldn't do here. And they simply expected it wouldn't and did not try it. Now, in Wisconsin to-day there are 800 young men belonging to the short course association, 800 men in Wisconsin scattered all over the state engaged in the special study of alfalfa. Think what that means to the 800 communities of Wisconsin. More than that, in Jefferson county at the present time there are something in the neighborhood of 2,500 acres. This spring the dealers tell me there are orders for seed already booked indicating a sowing of between three and four thousand acres, and that in this depressing season. A gentleman sowed 50 acres, a neighbor of mine. It was very thin poor soil. He had a poor crop last year, about two and a half tons to the acre. He sold the crop for a thousand dollars, $12 a ton. It cost him $1.20 to bale it, and he sold it to the alfalfa mill grinding company at Elgin, and he sold two car loads to the gentleman who owns the famous Guernsey cow that made 1013 pounds of butter last year. He sold another car to a gentleman at Duluth. I could have sold 500 carloads of alfalfa this year if I had had it, at $12 a ton on board cars. But I did not want to spare it, with the stock I have, about 80 Guernseys. I am a good deal like the old Pennsylvania Dutchman, "I don't know God Almighty how He feels towards me another year."

Methods of Seeding.

A Member: Do you grow the seed?

Gov. Hoard: I have been trying to grow the seed, but have been unable to do so yet. We have had wet seasons. They tell me you cannot grow it in a wet season.

A Member: How do you plant it?

Gov. Hoard: I sow it with a drill. You have those drills in this state where the grass seed box is in front?

A Member: Yes.

Gov. Hoard: Yes, that is the same as I have. I sow about 25 pounds to the acre on very heavy strong soil. Mr. Wing recommends 15 pounds. I prefer 10 pounds more for the sake of making it grow finer. I broke up a year ago 28 acres of alfalfa sod and planted it to corn. The neighbors say they never saw such a crop of corn on the place before. The mechanical effect of alfalfa roots upon that land is wonderful. It required three horses weighing about 1,500 pounds apiece with a jointer to break it, and you could hear it, it sounded like they were tearing the strongest piece of canvas you ever saw. It was like plowing through a hazel bush. The roots were in the soil so deep and so strong that it has a mechanical effect upon the land like this. A year ago last spring when I was breaking up and plowing my land—my land is heavy clay, it keeps me a little late sometimes, I got very anxious. I went at my plowing.

and feeling I was plowing when it was wrong, it was wrong, and all my land plowed shiny, you know how that is, all except the alfalfa field, and that plowed like an ash heap. I began to study. That field was like a paper box bored full of holes ten to fifteen feet deep. I tell you we have dug alfalfa roots from these old fields twelve to fifteen feet down, went down to find out. You can see what a tremendous mechanical effect such a plant has upon the land. One old German says, "Mein Gott in Himmel, I grow not that stuff on that lant, everything run all the way down through." I thought it would, that it might injure it, but it serves to oxygenate the soil, and grinds and breaks it up and has a mechanical effect like a sub-soiling plow on the land.

A Member: Do the roots go down through hard pan?

Gov. Hoard: If you have hard pan very near the surface—the larger part of your land is not hard pan that will interfere with it.

A Member: Hard yellow clay?

Gov. Hoard: It grows right straight through it. Goes right down through a yellow clay. I have that on portions of my farm. You dig down five and six feet and you will strike this hard and yellow clay, sticky yellow. It was a white oak soil.

Now, I have given some ideas of its feeding value, some ideas about its growing. Let me say this: prepare your soil, make as good a seed bed as possible. I threw away $60 worth of seed of a rye field, harrowed the rye field three times, loaded the harrow, tore it all to pieces, and sowed the alfalfa on, thinking it would grow as well as clover. I never got a thousand spears of alfalfa, got the biggest crop of rye I ever did get. But sow it with about a bushel of barley. Last year I sowed a bushel, but being a wet season part of it lodged. I got 40 bushels seed off the barley, 40 bushels for one. But it was an unusual season.

A Member: How about 60 day oats?

Gov. Hoard: I do not know.

A Member: How will it do on sandy soil?

Gov. Hoard: If you can get it started all right—if you will give a coat of manure, a heavy coat of manure. Suppose you give it a good heavy coat of manure in the fall, and then in the spring, and the next thing you go on with a disc and gave it a good heavy discing, harrowing, until you fine it down, then if you could give it about 30 bushels wood ashes, it is very greedy for that. If you can't get wood ashes you might get muriate or sulphate of potash, and disc your land that way and start it. If you can get it going through the first summer it will be all right from that time on.

On Limestone Land.

A Member: What about growing on limestone land?

Gov. Hoard: It prefers limestone land.

A Member: Clover burns out; it would not stay in. Does alfalfa do the same thing?

Gov. Hoard: Clover wants limestone land.

A Member: Can't get it to stay more than three years.

Gov. Hoard: The reason is that clover is a biennial and when once it forms its seed it dies of its own volition.

I do not believe there is any particular difficulty in growing alfalfa in Pennsylvania. Does the sweet clover grow here by the side of the road?

A Member: Yes.

Gov. Hoard: You need give yourself no uneasiness. Wherever sweet clover grows alfalfa grows almost indigenously if a man knows how to handle it.

A Member: Where do you buy your seed?

Gov. Hoard: I buy my seed usually of seedsmen, but I am pretty particular about it.

A Member: Which ones?

Gov. Hoard: Well, that is hardly fair to say, but I usually have sent into Montana and bought my seed.

How to Cure.

With alfalfa as with all kinds of hay, drying hay is not curing it. I want to repeat it, drying hay is not curing it. There is a wonderful difference in the feed value of clover and alfalfa, whether you cure in the cock or cure in the winrow and the sun. If you put it into the cock just as soon as the rake will gather it, just as soon as it will work on the rake, rake it up into the winrow, and from that up into the covered cocks, well capped. I use the hay cap. You do not know what is going to happen. The first crop is in the first of June, and I put on the hay cap. I have 1,500 of those little caps, they cost $120 a thousand. 12 cents apiece. (Explaining the use of the cap by illustration.)

A Member: Did you spread this hay after you put the caps on?

Gov. Hoard: About an hour or two. My men came along and lift it open for an hour or two ,just throw it open so the air can get to it, and oxygenate it, you know, and that will just finish the job. I want to haul it to that barn when it is just so the leaves won't fall.

A Member: How much do you spread each shock?

Gov. Hoard: Just a little, throw it out so as to give it a little air.

A Member: Do you like to haul in the heat of the day?

Gov. Hoard: I do not pay any attention to it. I haul it just as fast as I can. I am anxious to haul it before the leaves will drop.

A Member: What is your idea about inoculating the soil with other soil?

Gov. Hoard: I have tried it. I have drawn soil from the side of the road where sweet clover was growing, and drawn soil from one old field I had, on to a new field.

A Member: Do you think it helped it?

Gov. Hoard: Helped it. A year ago last fall I inoculated 22 acres with culture from the Department at Washington.

A Member: How much to the acre of the old soil?

Gov. Hoard: About a thousand pounds.

(Adjournment of the joint session. Stock Breeders to meet January 18, 1906.)

PENNSYLVANIA DAIRY UNION OFFICERS 1906

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LIST OF CREAMERIES IN PENNSYLVANIA

The following list is published with the two-fold purpose of furnishing it to those who want such a list and with the hope of securing correction, addition or omission. First class mail matter addressed to these parties has not been returned, therefore it is assumed that these creameries are still operated. It would be very much appreciated if parties knowing of creameries or cheese factories not included here, or included but not now in operation, will send word to that effect to

THE PRESIDENT,
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State College, Pa.

Adams Co.
- Bermudia.....B. D. Hostetter
- Cashtown.....Cashtown Creamery Co., L. W. Swartz, Manager.
- East Berlin.....E. Berlin Creamery Assn.
- East Berlin.....J. D. Hershey
- Gettysburg.....Jerry J. Plank
- Guernsey.....John Geiger
- Latimore.....Latimore Creamery Co., Jos. Lerew, President
- Latimore.....Wagner & Swartz
- New Oxford.....J. Diller & Co.

Allegheny Co.
- Wilkinsburg.....Brightview Dairy Co.

Armstrong Co.
- Cochran's Mills.Cochran's Mills Creamery
- Dayton.....Dayton Co-op. Creamery Assn.
- Top.....King & Woodward
- Whitesburg.....Whitesburg Creamery, Blaney & Son, Props.
- York Springs.....B. D. Hostetter

Beaver Co.
- Hookstown.....Hookstown Creamery

Bedford Co.
- Loysville.....Cold Springs Creamery Dickinson, Gilber & Kean
- Rainsburg.....George Morgart

Berks Co.
- Bally.....Frank Janson
- Bechtelsville.....James Moyer & Bro.
- Berne.....Levi M. Miller
- Bernville.....Ahrens & Richardson
- Bernville.....Bernville Creamery Co.
- Bethel.....Ahrens & Richardson
- Bowers.....Bowers' Creamery Co.
- Boyertown.....Grim's Mill Creamery
- Boyertown.....Boyertown Creamery
- Calcium.....Calcium Creamery
- Calcium.....Cleaver & Hoffman
- Centreport.....Samuel Kelchner
- Centreport.....Levi M. Miller
- Clayton.....Clayton Butter & Cheese Co.
- Crosskill Mills.....Ahrens & Richardson
- Douglassville.....Charles Buckwalter
- Eshback's.....Hines Bros
- Exeter Station.....H. B. Levan & Co.
- Fleetwood.....Fleetwood Creamery
- Fleetwood.....Daniel Kelchner
- Geiger's Mills.....Cold Run Creamery Co.
- Geiger's Mills.....Geiger's Mills Creamery
- Hamburg.....N. A. Coufer
- Huff's Church.....Nathan Lehser
- Kempton.....M. L. Ritter
- Kempton Station.....Howard G. Kimmel
- .....Excel'r Dairymen's Assn.
- Klinesville.....Klinesville Creamery
- Kutztown.....Kutztown Creamery
- Landis' Store.....Jos. Boyer & Bro.
- Lenhartsville.....F. B. Levan
- Lime Kiln.....Oley Line Creamery
- Little Oley.....Fritzer's Creamery, J. P. Thomas, Prop'r.
- Lyons Station.....Jno. G. Haring
- Manatawney.....Pleasantville Creamery
- Mertztown.....F. Moyer & Co.
- Mohrsville.....Isaac S. Fraunfelter
- Morgantown.....Jacob Hartz
- Morgantown.....Morgantown Creamery
- New Berlinville.....Congo Creamery
- New Berlinville....Gilbertsville Creamery
- New Berlinville.....W. H. Moyer
- New Jerusalem.....J. S. Henrich
- North Heidelberg.....Klapp & Kalback
- North Heidelberg.....Klopp's Creamery
- Obold.....Kalbach & Obold
- Oley.....Hartman & Bros.
- Reading .....Franklin St. Creamery
- Reading.....St. Lawrence Creamery
- Reading.....Spang & Zacharias
- Rehrersburg.....Ahrens & Richardson
- Rehrersburg.....Rehrersburg Creamery
- Schofer.....A. Gottschall
- Shartlesville.....Ahrens & Richardson
- Shoemakersville...Shoemakersville Cream.
- Stonersville.....Ahrens & Richardson
- Straustown.....Ahrens & Richardson
- Topton.....A. S. Heffner
- Upper Bern.....Levi M. Miller
- Virginsville.....M. L. Ritter
- West Leesport..Samuel H. Lenhart & Son
- Windsor Castle.....M. L. Ritter
- Yellow House.....Amos Hartman
- Yellow House.....Home Creamery

Blair Co.
- Tyrone.....Hoffman Bros. Creamery
- Henrietta.....Elmer S. Berget
- Henrietta.....D. D. Morell

Bradford Co.
- Alba.....Alba Butter Mfg. Co.
- Allis Hollow...Allis Hollow Creamery Co.
- Allis Hollow.....Union Creamery Co. Ltd.
- Austinville.....Austinville Co-Operative Creamery Co.
- Burlington.....Burlington Creamery
- Brad.....Wyalusing Creamery
- Cadis.....J. W. Prince
- Camptown.....Fuller & Blocker
- Columbia Cross Roads.....
- .....Austinville Creamery Co.
- Coryland.....Coryland Creamery
- Durell.....Durell Creamery
- East Canton.....Silverdale Creamery Co.
- East Smithfield.....D. A. Stephen

East Troy.....East Troy Butter Mfg. Co.
Grover.....S. S. Vermilya
Le Raysville.....W. B. Stevens
Milan.....Pennsylvania Cry. Co.
Minnequa.....James Ketcham
Myersburg.....M. Butter & Cheese Co.
New Albany...New Albany Creamery Co.
North Orwell.....George Pennell
North Orwell.....Baker Brothers
Potterville.....Potterville Creamery Co.
Potterville.....Orwell Creamery Co. Ltd.
Smithfield.....Stevens Creamery
South Warren.....Baker Brothers
South Warren.....Best & Wheaton
Stevensville.....Stevensville Assn.
Troy.....S. H. Heywood
Warren Centre.....G. A. Brown
Warren Centre.....A. Rohrbasser
Windham Centre.....A. Rohrbasser

Bucks Co.
Argus.....C. T. Hixon
Bedminster.....Bedminster Creamery
Bedminster.....J. F. Hulsheiser
Bedminster.....J. F. Kilmer
Bedminster.....Moyer & Hulshiser
Blooming Glen...Blooming Glen Creamery
Blooming Glen..Pleasant Sprgs Creamery
Buckingham...Blooming Valley Creamery
Buckingham.....
Buckingham Valley Dairymen's Assn.
Bucksville.....Kaiser & Kramer
Bursonville.....Hixon & Mills
Carversville.....Cary Betz
Carversville.....C. Roberts
Chalfont.....Chalfont Creamery
Chalfont.....A. H. Faust & Co.
Church Hill.....Church Hill Creamery
Church Hill.....Jos. Guldin
Cressman.....Milton H. Hinkle
Danborough.....Ottsville Creamery
Doylestown.....Cold Spring Dairy Co
Dublin.....Dublin Dairymen's Assn.
Durham.....Durham Creamery
Erwinna.....George Scott
Forest Grove.....Forest Grove Creamery
Gardenville.....Gotwals & Son
Geryville.....Krausdale Creamery
Jamison.....Warwick Township Creamery
Keller's Church.....Wilson S. Atherholt
Levin.....Frank Heterick
Makefield.....Makefield Creamery
Milford Square.....Henry G. George
Milford Square.....A. C. Moyer
Neshaminy.....W. W. Carr
Neshaminy.....Paul Valley Creamery
Nockamixon...F. M. Moyer Via Ferndale
Nockamixon.....Nockamixon Creamery
Ottsville.....Aaron Leatherman
Passer.....J. H. Shelly
Perkasie.....Henry O. Moyer
Pineville.....Pineville Creamery
Pipersville.....A. M. Gerhart
Pleasant Valley.....Diming & Gerhart
Pleasant Valley.....J. H. Shelly
Plumsteadville.....
Plumsteadville Cream. Assn.
Quakertown.....C. T. Hixon
Quakertown.....William S. Taylor
Richlandtown..Keller's Church Creamery
Richlandtown.....Richlandtown Creamery
Richland Centre.....Landis & Moyer
Richlandtown.....Cold Springs Creamery
Shelly.....Henry B. Weiss
Solebury.....Solebury Dairy Assn
Spinnerstown.....Dairymen's Association
Springtown.....Hixon & Mills
Steinburg.....O. H. Erdman
Tohickon.....J. D. Stover
Trumbauersville..Sinking Springs Cream.
Wismer.....Union Dairy Association
Yardley.....Yardley Creamery
Zion Hill.....Henry B. Weiss

Butler Co.
Conoquenessing.....Stern & Dumbaugh
Great Belt.....Great Belt Creamery
Denny.....West Penn Creamery Co.
Portersville.....Portersville Creamery Co.
Prospect.....Prospect Creamery Co.
Slippery Rock..Slippery Rock Cream. Co.

Cambria Co.
Carrolltown.....Farmers' Creamery

Carbon Co.
Little Gap.....W. M. Benninger

Centre Co.
Bellefonte.....Rock Farms Creamery
Bellefonte.....Howard Creamery Cor.
Howard P. O.....C. M. Muffley
Rebersburg.....Frank & Stover
Rebersburg....Spring Mills Creamery Co.
Spring Mills.....Spring Mills Creamery
State College.....State College Creamery

Chester Co.
Anselma.....Pikeland Creamery
Avondale.....Lamborn's Creamery
Brandywine Manor.....Reid's Creamery
Buck Run.....Ercildoun Creamery
Buck Run.....C. J. & J. E. Moore
Cedar Knoll.....Lafayette Creamery
Chadds Ford.....E. Darlington & Bro.
Chesterville.....Marvell Bros.
Cochranville.....Cochran Creamery
Cochranville.....Cochranville Creamery
Collamer.....Isaac Evans
Collamer.....W. Evans & Son
Collamer.....E. B. Herr
Cossart.....Brandywine Creamery
Cossart.....James B. Pyle
Doe Run.....H. A. Clark
Doe Run.....Darlington Creamery
Doe Run.....Milton Darlington
Doe Run.....H. A. Taylor
East Coventry...East Coventry Creamery
Elk View.....Dr. Quimby
Elk View.....T. Thomas Webb
Embreeville.....J. L. Cunningham
Fairville.....Sharpless Creamery
Font.....Fairmont Creamery
Glen Roy.....E. B. Herr
Hickory Hill.....Hickory Hill Creamery
Honeybrook.....C. D. & P. H. Emery
Honeybrook.....Pennsylvania Creamery
Kelton.....S. Morris Jones
Kembleville.....Byers' Creamery
Kembleville.....Kembleville Creamery
Kennett Square.....Bernard's Creamery
Kennett Square....Kennett Square Cream.
Kennett Square.....Wm. Sharpless
Landenburg.....Alfred Sharpless
Lenover.....H. S. Boyd
Leonard.....Rosedale Creamery
Lincoln University.....Nieweg Bros.
Londonderry.....J. H. Donald
London Grove.....J. C. Sharpless
Marsh.....Marsh Creamery
New Garden.....New Garden Creamery
New London.....Frank Kirk
New London.....Theodore Kirk & Son
Oxford.....Big Elk Dairies
Oxford.....Hill Crest Creamery
Oxford.....H. D. & E. A. Pugh
Oxford.....Geo. D. Woodside & Co.
Parksburg.....Cochran Creamery
Phoenixville.....Red Bank Creamery
Pughtown.....D. Wadleigh
Roberts.....Thomas Hatfield & Son
Russellville.....J. H. Brosius
Russellville.....Russellville Creamery
St. Peters.....Farmers' Creamery
Schuylkill.....Schuylkill Creamery
Sheeder P. O.....James C. Roberts & Son
Sheeder.....Vincent Creamery
Spring City.....Spring City Creamery
Suplee.....Enterprise Creamery

Toughkenamon.....Josiah Lamborn
Toughkenamon.....Wm. Sharpless
Tweedale.....E. B. Herr
Unionville.....John C. Gray
Unionville.....Unionville Creamery
Vincent.....E. B. Gasher
Vincent.....R. Heistand
Wagontown.....Harry Schrack
Wagontown.....West Caln Creamery
Warwick.....Marst Creamery
West Chester.....Allerton Creamery
West Vincent..Lewis H. Evans, Secretary
West Chester.....George Faucetts & Son
West Chester.....Harper Creamery
West Chester.....Wm. B. Harvey
West Chester.....Homestead Creamery
West Chester.....West Chester Creamery
West Chester.....West Chester Dairy
West Chester.....E. Roberts' Creamery
Whitford.....Whitford Creamery
Whitford.....Arnold M. Wilber
Williams' Corners.....Charles Buckwalter
Williams' Corners.....Morris Mackissic
Willowdale.....Willowdale Creamery
Wrightsdale.....Wrightsdale Creamery

Crawford Co.
Beaver Centre.....Clark & Gates
Beaver Centre.....Green, Clark & Co.
Blooming Valley
Blooming Valley Cheese Co.
Centreville.....Centreville Creamery
Conneautville.....J. W. Clark
Crossingville.....Crossingville Creamery
Dicksonburg.....T. S. Lavery
Espyville.....A. W. Wall
Frenchtown.....Augustus Polley
Guys Mills.....L. C. McGaw
Jewell.....Jewell Cheese Factory Co.
Jewell.....N. O. Stanford
Hickernell.....Hickernell Creamery
Lincolnville.....Lincolnville Creamery
Linesville.....A. B. Griffin
Long's Stand.....A. J. Miller
Miller's Station.....L. C. McGaw
Penn Line.....L. C. McGaw
Pinney Corners.....D. H. Nodine
Pinney Corners....Richmond & Woodcock
Rundell's.....McGaw & Cooper
Saegerstown.....A. B. Long
Saegerstown.....Long & Reiche
Spartansburg.....Concord Creamery
Spartansburg.....Hyde & Baker
Springboro.....J. J. Howard
Townville.....A. L. Squier
Troy Centre.....Grove & McDowell
Troy Centre.....Troy Centre Creamery
Westford.....J. S. Martin
Woodcock.....N. J. Gerrow
Woodcock.....Price Bros.
Woodcock.....Sherred & Norris

Clarion Co.
Clarion.....Clarion Creamery
Lickingville.....Pioneer Creamery Co.
Limestone.....Limestone Creamery Co.
Marble.....Enterprise Creamery
Newmansville.....Pioneer Creamery Co.

Clearfield Co.
Clearfield.....Clearfield Creamery Co.
Clearfield.....James Mitchell

Clinton Co.
Loganton.....Loganton Creamery
Salona.....Salona Creamery

Columbia Co.
Berwick.....Fairview Creamery
Millville.....Millville Creamery

Cumberland Co.
Allen...Cumberland Valley Creamery Co.
Carlisle.....Letort Creamery
Craighead.....B. W. Hasler
Hatton.....Keystone Creamery
Mechanicsburg,
Cumberland Valley Creamery
Mechanicsburg...Mechanicsburg Creamery
New Kingston
Cumberland Valley Creamery Co.
Newville.....Big Springs Separator
Shippensburg.....B. D. Biggs & Son
Shippensburg.....Jacob Reigle
Williams' Mills,
Cumberland Valley Creamery Co.

Dauphin Co.
Berrysburg.....Peter L. Stine
Deodate.....Ezra C. Foltz
Fisherville.....Cornelius Bixler
Fisherville.....Fisherville Creamery
Grantville.....Stauffer & Rapp
Gratz.....Jacob Arnott
Harrisburg.....S. F. Barber
Hummelstown.....Model Creamery
Millersburg.....C. F. Moyer
Powl's Valley.....C. Bixler & Son
Progress.....John H. Sheesley
Swatara.....Conewago Creamery
Union Deposit.....Stauffer & Rapp

Delaware Co.
Brandywine Summit.....Miller & Heyburn
Chadd's Ford.....E. Darlington & Bro.
Cheyney.....Thos. Cheyney
Cheyney.....Frank G. Thomas
Concordville.....P. E. Sharpless
Darling.....Darlington Creamery
Darlington.....M. F. Darlington & Son
Villanova.....Villanova Creamery
Wallingford.....Wallingford Creamery
Wallingford.....Wallingford Dairy Co.
Ward.....Pennock E. Sharpless

Elk Co.
Ridgway.....Ridgway Creamery Co.
St. Mary's.....St. Mary's Creamery

Erie Co.
Albion.....W. S. Boyle
Corry.....Corry Creamery
Corry.....J. C. Wales
Edinboro.....Lavery & Co.
Ferdinand.....W. Union Cheese Factory
Franklin Corners.....Frank Billings
Greenfield..Greenfield Butter & Cheese Co.
Greenfield.....Thomas Bros.
Itley.....William Marsh
Juva.....Barnes & Lockwood
Lavery.....J. S. Lavery
Le Boeuf.....C. M. Wheeler
Lovell's Station.....Crowells McCrary
McLane.....Wm. Marsh
McKean.....J. C. Spence
McLallan's Corners....Shrade & Rockwell
Mill Village.....J. M. Tuttle
Mill Village.....Wilson S. Durham
Mystic.....J. H. Waterhouse
Ovid.....Mark L. Howard
Phillipsville.....Alfred Moore
Pont.....R. B. Gates
Sterrettania.....Joseph H. Hauch
Sterrettania.....Sterrettania Creamery
Tellar.....C. D. Faulkner
Union City.....Geo. W. Carroll
Wattsburg.....F. W. Edmunds
Wattsburg.....Keystone Creamery Co.
Waterford.....Sharps Creamery
Waterford.....Vananden & Gillet

Fayette Co.
East Riverside.....M. R. Jacobs
Farmington.....Cheese Factory
New Haven.....New Haven Butter Co.

Franklin Co.
Chambersburg....Chambersburg Creamery
Edenville.....Franklin Creamery Co.
Green Village...Green Village Creamery
Guilford Springs.....Spring's Dairy
Lemaster's.....J. R. Lemaster & Son
Markes.....J. R. Lemaster & Son
Mercersburg...Mercersburg Creamery Co.
Shady Grove...Nicodemus Creamery Assn
Waynesboro.....Blue Mountain Creamery

Williamson.....Williamson Creamery Co.
Willow Hill.....McCurdy & Elder
Fulton Co.
McConnellsburg.....W. L. Sloan
McConnellsburg...McConnellsburg Cream.
Greene Co.
Carmichaels.....Carmichaels Creamery
Huntingdon Co.
McAlevy's Fort..McAlevy's Fort Creamery
Morrell .....Morrell Butter & Cheese Co.
Pennsylvania Furnace.....Hoffman Bros.
Petersburg .....Petersburg Creamery
Indiana Co.
Elder's Ridge..Co-operative Creamery Co.
Homer City .....H. C. English
Homer City.....Homer City Creamery
Jefferson Co.
Sugar Hill.....J. N. Atwell & Co.
Juniata Co.
Cocolamus .....Brown & Co.
East Salem .....S. Schlegal
East Salem.....East Salem Creamery
McAllisterville
Shellenberger & Hambright
McCoysville .....B. C. Cubbeison
Mifflintown .....J. G. Haldeman
Port Royal.....Port Royal Creamery
Thompsontown.....J. G. Haldeman
Lackawanna Co.
Moscow .....Moscow Creamery
Scranton .....Wm. Conrad
Scranton .....E. S. Decker
Lancaster Co.
Bainbridge .....Coday Creamery
Bart .....Bart Creamery
Bartville .....W. B. Ferguson
Bethesda .....Bethesda Creamery
Bird-in-hand.....Bird-in-hand Creamery
Bird-in-hand..... F. Bowman
Blue Ball .....S. H. Musselman
Buck .....Buck Creamery
Cambridge .....Cambridge Creamery
Cambridge .....E. J. & P. H. Emery
Cambridge .....George I. Emery
Christiana .....Christiana Creamery
Cocalico .....Cocalico Creamery
Colemanville .....George Garret
Collens .....Herr & Maull
Denver .....Daniel Gebble
Elizabethtown...Elizabethtown Creamery
Ephrata .....J. H. Yeiser
Fairland .....John Reist
Farmersville .....Harry J. Shaffer
Fertility.....Fertility Creamery Co.
Florin .....Florin Creamery
Furniss .....C. P. Grigg
Gap .....Gap Creamery Co., Ltd.
Glenola .....Johnsville Creamery
Glenola .....H. M. Stauffer
Goshen .....The Elam Dairy Co.
Goshen.....Goshen Creamery
Goshen .....Amos Walton
Hahnstown .....John Fry's Sons
Kirkwood .....Ezra Hess
Kirkwood .....Graybill Stone
Landisville .....Levi H. Hershey
Landisville.....Landisville Creamery
Lititz.....Garber, Reist & Co.
Manheim .....Hershey Bros.
Marticville .....M. C. Eshelman
Mascot .....Stumptown Creamery
Mastersonville ....Farmers' Creamery Co.
Mastersonville
Mastersonville Creamery Assn.
May .....Johnson & Gilbert
McSparran.....Peters' Creek Creamery
McSparran.....Willow Dale Creamery
Mt. Joy .....Farmers' Creamery Co.
Mt. Joy.....Reist, Nissley & So.
Mount Nebo.....Mt. Nebo Creamery Asso.
New Providence.....Dickinson & Gilbert
Octoraro .....J. H. Brosius
Pleasant Grove .....Carter & Mills
Pleasant Grove .....Conowingo Creamery
Pleasant Grove .....Garber & Swisher
Quarryville .....Dickinson & Gilbert
Quarryville .....Quarryville Creamery
Reinhold Station..Reinhold Station Cream.
Safe Harbor.....Kaufman & McMesbong
Safe Harbor .....Manor Creamery
Smithville.....Harry S. Wigging & Co.
Smyrna.....Smyrna Creamery Co.
Spruce Grove .....M. Keech
Spruce Grove.....Milton Keech
Stevens .....Stevens Creamery
Terre Hill.....Terre Hill Creamery
Unicorn .....Unicorn Creamery
Unicorn .....J. E. Moore
White Rock .....Elm Creamery Co.
White Rock .....Wm. G. Patton
White Rock .....White Rock Creamery
Windom .....Champion Creamery Co.
Lawrence Co.
Enon Valley .....Enon Valley Creamery
Neshannock Falls
Neshannock Falls Creamery
New Castle .....Midway Butter Co.
Pulaski .....John S. Evans
Volant.....J. Wilken & Son
Lebanon Co.
Bellegrove .....Cleona Creamery Co.
Campbellstown..Campbellstown Creamery
Cleona .....Cleona Creamery
Fontana .....Cleona Creamery Co.
Fredericksburg.....L. S. Gerhart
Jonestown.....Z. T. Gingrich
Lawn .....Lawn Creamery Co.
Lebanon.....City Creamery
Millbach .....Millbach Creamery Co.
Myerstown .....Bassler Creamery
Myerstown .....George W. Donges
Myerstown .....Mengle & Yost
Ono .....L. S. Gerhart
Palmyra.....Elizabethtown Creamery Co.
Prescott .....Henry Haak
Richland Station
Big Spring Creamery Co.
Richland Station.....G. E. Brownback
Richland Station.....Henry Haak
Lehigh Co.
Alburtis.....Spring Creek Creamery Co.
Allentown .....Spring Creek Creamery
Catasauqua .....Howertown Creamery
Coopersburg .....W. H. Steininger
Coopersburg .....Landis & Co.
Hosensack .....L. H. Brownell
Hosensack .....Hosensack Creamery
Lanark .....J. C. Richard
Lyon Valley.....Lyon Valley Creamery
Lyon Valley .....M. C. Rollman
Macungie .....E. M. Laux & Co.
Macungie .....Macungie Creamery
Macungie .....Schuler Brothers
New Tripoli .....Miller & Gilmer
Plover .....W. R. Schuler
Sigmund .....Jacob Faust & Son
Steinsville .....Steinsville Creamery
Vera Cruz.....Schuler Bros.
Vera Cruz .....Vera Cruz Creamery
Wanamaker .....John K. Fetherolf
Werley's Corner .....O. P. Werley
Luzerne Co.
Hazleton .....Rhone Trescott
Hazleton .....J. M. Williams
Wilkes Barre.....Standard Dairy Co. Ltd.
Lycoming Co.
Muncy .....Muncy Creamery
McKean Co.
Eldred .....Eldred B. & C. Co.
Kane .....Kane Creamery Co.
Myrtle .....R. G. Wooden
Port Allegany.....Acme Creamery Co.
Port Allegany.....L. B. Ray
Port Allegany.....T. B. Ray

Smethport
Naundah Butter & Creamery Co.
Mercer Co.
Greenville .....Greenville Creamery
Grove City.....Library Grove City Coll
Grove City .....A. H. Beatty
Indian Run.....T. P. Munnell
Jamestown .....W. B. Plant
London .....London Creamery Co.
Mercer .....Louden Creamery Co.
Mercer .....McDonaldson & Zehniser
Mercer.....Mercer Creamery Co. Ltd.
New Vernon .....J. A. Carey
Sharpsville .....Sharpsville Creamery
Volant .....S. A. Williams
Mifflin Co.
Allensville .....Allensville Creamery
Belleville .....Belleville Creamery
Mattawana .....Mattawana Creamery
McVeytown .....John M. Hassinger
Reedsville .....D. Z. Detweiler
Reedsville.....A. L. Detweiler
Reedsville .....Reedsville Creamery
Monroe Co.
East Stroudsburg
Beechpond Creamery Co.
Lamartine.....Salem Creamery Co.
Limestone..... Greenville Creamery
Montour Co.
Washingtonville.....Mengle & Luckenbill
Montgomery Co.
Cedars .....J. P. Bustard
Colmar .....Colmar Creamery
Colmar .....John Holley
Congo .....Congo Creamery
Creamery...Perkiomen Dairymen's Assn.
Earlington .....H. C. Durstine
Earlington .....J. G. Hunsicker
Earlington .....John Landis
East Greenville...East Greenville Cream.
East Greenville .....Adam Krauss
Fairview Village
Fairview Village Creamery Assn.
Franconia .....J. N. Freed
Franconia .....Indian Creek Creamery
Franconia .....John K. Landis
Frederick .....Green Tree Creamery
Grater's Ford .....A. G. Fly
Grater's Ford...Grater's Ford Cream. Co.
Hatfield .....Drake's Corner Creamery
Hatfield .....Aaron Tyson
Hillegas .....J. H. Faust
Hillegas .....Hillegas Creamery Co.
Hoppenville .....McLean's Creamery
Hoppenville .....J. T. Moyer
Iron Bridge...Harmony Grange Creamery
Kulpsville.....Towamensing Creamery Co.
Lederachsville.....Andrew T. Garber
Lederachsville.....Wide Awake Creamery
Lederachsville .....Worcester Creamery
Limerick .....Garret E. Brownback
Limerick .....Samuel Y. Eisenberg
Linfield .....G. E. Brownback
Linfield .....Samuel Y. Eisenberg
Linfield .....P. J. Reifsnyder
Lucon .....Lucon Creamery Co.
Mainland .....Mainland Creamery Co.
Narcissa .....Plymouth Valley Creamery
North Wales .....C. W. Hoffman
Obelisk.....Green Tree Dairymen's Assn.
Perkiomenville .....J. M. Reed
Pottstown .....S. G. Fly
Pottstown .....Miller Bros. Creamery
Prospectville..Prospectville Creamery Co.
Royersford .....Mingo Creamery
Salfordville.....Upper Salford Creamery
Sanatoga .....Sanatoga Creamery
Sassmansville...Sassmansville Cream. Co.
Schwenksville .....William Bromer
Schwenksville..Dairymen's Creamery Ass.
Schwenksville.....William G. Ziegler
Shannonville .....J. D. Godshalk
Skippack...Schwenksville Creamery Assn.
Spring House .....R. R. Jones
Trappe .....Spring Valley Creamery
Willow Grove...Willow Grove Creamery
Worcester.....Farmers' Creamery Assn.
Yerkes .....Yerkes Creamery
Northampton Co.
Bath .....W. H. Landis
Benningers.....W. M. Benninger & Son
Bingen .....Campbell & Appel
Bushkill Centre...Bushkill Centre Cream.
Butztown .....Butztown Creamery
Cherryville .....L. D. Meckley
Hecktown .....Heckertown Creamery
Hecktown.....W. H. Landis
Hecktown .....S. D. Steuben
Moorestown .....H. S. Kratz
Nazareth .....H. S. Kratz
Nazareth .....Nazareth Creamery Co.
Petersville .....Wm. A. Slot
Plainfield .....Plainfield Creamery
Stockertown .....Stockton Creamery Co.
Stone Church.....W. M. Benninger
Stone Church.....Jordon McIntyre
Walnutport .....W. M. Benninger
Weaversville.....Dairymens' Association
Weaversville .....Wm. M. Smith
Youngs .....Frank Young
Northumberland Co.
Chillisquaque .....C. L. Butler
Milton.....Pleasant Valley Creamery Co.
Montandom.....Cold Spring Creamery
Sedan .....Wm. Dunn
Sunbury .....Chas. R. Rinehart
Sunbury .....Sunbury Creamery Co.
Perry Co.
Elliottsburg .....E. J. Kistler
Loysville.....Loysville Creamery Co.
Millerstown .....J. C. Kipp
Pike Co.
Matamoras .....Matamoras Creamery
Potter Co.
Bingham Centre .....W. J. Clark
Bingham Centre .....R. H. Howe
Bingham Centre .....Richard Labor
Elmer .....Cheese Factory
Newfield .....W. J. Grover
Raymonds .....E. J. Conable
Raymonds .....W. B. Perkins
White's Corners...White's Corners Cream.
Schuylkill Co.
Orwigsburg .....A. F. Kimmel
Rausch's.....Salem W. Koch
Tamaqua .....Henry M. Enterline
Snyder Co.
McClure .....Ulsh & Bro.
Susquehanna Co.
Alford .....Alford Creamery
Auburn Centre
Shannon Hill Co-Op. Creamery
Auburn 4 Corners
Auburn 4 Corners Creamery Co.
Birchardville .....C. P. Ball
Birchardville.....Birchardville Creamery
Birchardville.....Excelsior Creamery Co.
Brooklyn .....Brooklyn Creamery
Choconut...Choconut Valley Creamery Co.
Dimock .....Dimock Creamery Co.
East Rush.....East Rush Creamery Co.
East New Milford
Mountain Lake Creamery Co.
Fairdale .....C. P. Ball
Fairdale .....Fairdale Creamery
Fairdale .....Seiler Bros.
Forest Lake
Forest Lake Creamery Co.
Forest Lake
Kingsley Union Creamery Co.
Franklin Forks..Franklin Forks Creamery
Gibson .....Harford Dairy Co.
Heartlake .....Heartlake Creamery
Harford .....Harford Dairy Co.

Hop Bottom
Hop Bottom Butter & Milk Co.
Hop Bottom.....Hop Bottom Creamery
Kingsley.....Kingsley Creamery Co. Ltd.
Kingsley.....Kingsley Union Creamery
Kingsley..Robinson Wollworth & Kingsley
Lawsville Centre
Lawsville Co-Op. Creamery
Little Meadows.....Iron Bridge Creamery
Little Meadows..Little Meadows Creamery
Middletown.....Iron Bridge Creamery Co.
Middletown Centre
Middletown Ctr. Creamery Co.
Montrose .....Montrose Dairy Co.
Montrose .....Seiler Bros.
Montrose.....Beech Bros.
Montrose.....Beebe Creamery
Montrose.....Montrose Creamery Co.
Montrose.....Silver Lake Creamery
New Milford.....Kingsley Creamery Co.
New Milford...New Milford Creamery Co.
Rush .....Rush Creamery Co.
Rush .....Rush Centre Creamery Co.
Rushboro .....Treasurer
Rushboro .....Jersey Hill Creamery Co.
Rushboro.....East Rush Creamery Co.
Rushville .....Rushville Creamery Co.
Silver Lake.....Quaker Lake Creamery
Springville .....Springville Creamery
South Gibson .....Harford Dairy Co.
Tiffany .....Tiffany Creamery
Thompson .....Thompson Creamery

Tioga Co.
Austinburg .....E. A. Bean
Austinburg .....Cheese Factory
Balsam .....Balsam Cheese Factory
East Chatham .....D. Avery
Elkland .....Elkland Creamery
Elkland .....Cheese Factory
Keennyville .....Cheese Factory
Knoxville .....E. A. Dean
Knoxville .....Cheese Factory
Knoxville.....Pennsylvania Creamery Co.
Lawrenceville.....Lawrenceville Creamery
Liberty .....Worlin Miller
Little Marsh.....W. Wass & Co.
Little Marsh.....Cheese Factory
Mansfield .....Pitts & Spurr
Mansfield .....West Sullivan Creamery
Via Lansing.....J. Rushmore
Nelson....Nelson Separator & Butter Co.
Round Top.....E. A. Close
Stony Fork.....Stony Fork Creamery
Sylvester .....E. O. Bean
Wellsboro .....G. B. Close

Union Co.
Lewisburg.....Buffalo Valley Creamery
Mifflinburg.....Crystal Springs Creamery

Venango Co.
Oil City.....M. B. Crowther

Warren Co.
Ackley Station.....Young & Clark
Bear Lake .....Frank Parkhurst
Chandlers' Valley.....Valley Creamery
Columbus .....J. U. Wells
Garland .....Garland Cheese Co,
Grand Valley.....Valley Creamery
Lander .....James Currie
Lander .....E. S. Griggs
Lottsville .....Vern Grigg
Spring Creek .....Willowdale Creamery
Sugar Grove.....Acme Creamery Co.
Sugar Grove.....George Hampson
Youngsville.....Youngsville Creamery Co.

Washington Co.
Bulger .....Peter Hernes
Bulger.....Ohio & Pgh. Milk Co.'s Cr'y
Claysville .....Claysville Creamery
West Alexandria..McCamom & Chambers
West Alexandria..Jas. A. Chambers & Co.

Wayne Co.
Ariel .....Lakeside Creamery
Beach Lake.....Beach Pond Creamery
Clemo .....Clemo Creamery Co.
Gravity .....Gravity Co-Op. Creamery
Gravity.....Georgetown Creamery
Honesdale.....Crystal Spring Creamery
Newfoundland.....Hopdale Co-Op. Co.
Seeleyville .....G. & C. Smith
Seeleyville.....Silver Creek Creamery Co.
Starlight.....Starlight Dairy Co.

Westmoreland Co.
Markle .....Markle Creamery
Mt. Pleasant.....Mt. Pleasant Creamery
Scott Haven.....McGrew & Bros.
Smithton .....Smithton Creamery

Wyoming Co.
Factoryville.....Factoryville Creamery
Laceyville.....Bradford Co. Creamery Co.
Lemon .....Lemon Creamery
Nicholson .....Nicholson Creamery
Nicholson .....L. H. Pratt

York Co.
Big Mount.....A. B. Mummert
Bridgeton .....Bridgeton Creamery
Brodbecks.....Brodbecks Sta. Creamery
Brodbecks.....Miller & Bortner
Delta .....Daniel Hollingsworth
Dillsburg.....Dillsburg & Elgin
Dover..... Dover Creamery
East Berlin.....East Berlin Creamery
Felton.....R. Grove & Brother
Gatchellville.....Pleasant Grove Creamery
Glennville .....Glennville Creamery
Hanover .....Hanover Creamery
Hanover.....York & Adams Creamery
Hanover.....Reist, Nissley & Co.
Muddy Creek Forks,
Pleasant Grove Creamery
New Freedom,.....August J. Gillen
New Sinsheim,.....Israel K. Zeigler
Porter's Sideling,.....C. C. Wooden
Railroad.....J. A. Wetrick
Shrewsbury.....Shrewsbury Creamery
South Beaver St. York.....Mr. Budd
Spring Forge.....Wagner & Swartz
Slate Hill....Cool Spring Creamery Co.
Slab.....C. C. Smith & Bro.
Wellsville.....T. C. Cleaver

MEMBERS OF PENNSYLVANIA DAIRY UNION

Armsby, H. P.....State College
Armstrong, A. B.....Smith Port
Ahrens & Richardson (Individual Members)
Bernville
Ahrens, H. E..... .....Bernville
Barber, S. F.....Harrisburg
Buchanan, J. B.....Kendall
Branson, J. L.....Langhorn
Brown, U. S.....Troy
Bustard, J. P.....Cedars
Benninger, W. M.....Walnutport
Big Spring Cry.....Bellefonte
Brinton, Sam. L.....West Chester
Bran, E. A.....Knoxville
Barry, R. A.....173 Chambers St., N. Y.
Byler, S. F.....Bird-in-Hand
Blocher, J. F.....Spring Hill
Bayard, E. S.....Pittsburg
Comfort, H. W.....Fallsington
Cornell, Geo.....Columbia Cross Roads

Crandall, C. L.....Alba
Carter, John I.....West Chester
Chaffer, O.....Hatch Hollow
Cumber, Geo. W.....Steelton
Cornell, A. M.....Columbia Cross Roads
Carter, C.....West Chester
Coburn Grain & Creamery Co.....Coburn
Carter, J. M.....Chatham
Gilbreath, W. R.....State Hill
Comfort, J. R.....West Chester
Colegrove, C. B.....Corry
Darlington, M., Sons.....Pomeroy
Downing, S. R.....Goshenville
Darlington, John H.....West Chester
Dietrich, E. G.....Cathanangies, N. Y.
Duff, W. O.....Martinsburg
Dinun, D. B.....Thompstontown
Dicher & Gilbert.....Quarryville
Danner, Harry B.....Porters Sideling
Darlington, Jesse .....West Chester
Dunkle, Martin L.....Lewisburg
Detrich, Rev. J. D.....West Chester
Embroe, W. G.....West Chester
Millville Cry. Co. (Eckman, C. W.)..Millville
Eldridge, Jonathan.....West Chester
Eshleman, Christian..... Shippensburg
Estus, E. W.....E. Rush
Forney, D. P.....Hanover
Faucette, C. P., Sons.....West Chester
Forsythe, Geo.....West Chester
Fallett, C. F.....Ovid
Gill, E. T.....Haddonfield, N. J.
Gramley, T. M.....Spring Mills
Garber, E. L.....Lititz
Green Tree Cry. Asso.....Obelisk
Griffis, Bruce S.....West Leroy
Garner, D. W.....Taneytown, Md.
Gates, F. A.....Hadley
Good, C. H.....415 North 9th st., Lebanon
Haldeman, J. G.....Mifflintown
Haines, Chas.....Maple Shade, N. J.
Harvey, Wm. B.....W. Grove
Hughes, Mark.....W. Grove
Hartley, R. S.....Pittsfield
Hassler, E. O.....Harrisburg
Hutchinson, Geo. C.....Warriors Mark
Hiesey, S. C.....Rheems
Howard Cry..... Howard
Heltman, T. M.....Mackeysville
Ivins, M. H.....Penn Valley
Ingram, Edw. T.....West Chester
Ingram, Chas. B.....West Chester
Jones, Morris.....W. Grove
Jones, U. H.....Upper Darby
Kelkeffer, E. H.....Hanover
Lippencoot, B. A.....Haddon Heights, N. J.
Loomis, L. E.....E. Troy
Lighty, L. W.....E. Berlin
Lehman, J. R.....Warriors Mark
Lawrence, W. T.....E. Canton
Lester, T. W.....Troy
Leonard, L. M.....Granville Center
Leonard, A..... Troy
Lavery, J. S.....Lavery
Lehman, John H.....Warriors Mark
Lewis, S. H.....Coudersport
Leonard, Chas. A.....Granville Center
Liekert, H. W.....Black Lick
Marshall, Henry..... Norway
Morrill, D. A.....Arch Spring
May, L. D.....Granville Center
Marshall, W. D.....Lindell
Main, J. M.....Shippensburg
Murray, C. H.....Pottsgrove
Martin, Ziba C.....West Chester
Morris, J. C., M. D.....1514 Spruce st., Phila.
Manley, Joel F.....E. Canton
Neiderriter, S..... Marble
Notestine, D. E.....Lewistown
Northrup, C. D.....Elkland
Nicely, A. R.....Hanover
Night, P. M.....E. Canton
Norton, W. C.....Creamton
Nissly, Christian L.....Florin
Nissly, Martin R.....Mechanicsburg
Orr, C. F.....Limestone
Darlington, Edw. J.....Chadds Ford
Palmer, Henry..... Avondale
Piolet, Louis..... Wysox
Perham, W. E.....Niagara
Pearson, Dr. Leonard....Sta. B, Philadelphia
Possinger, A. F.....W. Auburn
Price, Jacob, M. D.....W. Chester
Pugh Bros..... Oxford
Pleasant Valley Cry. Co.....Milton
Pearson, R. A,, Prof.....Ithaca, N. Y.
McCoy, L. J.....Elk City
Reynolds, G. H.....Alba
Riley, John..... Harrisburg
Reist, J. G.....Mt. Joy
Richardson, C. M.....Bernville
Rutherford, W. F.....Harrisburg
Rutherford, J. Q. A.....Harrisburg
Root, A. D.....Bear Lake
Ross, Wm. M.....Sturtevant
Rutler, John H. .....York
Reed, A. H...30th & Market sts., Philadelphia
Rhinehark, H. L.....1937 Market st., Phila.
Reeder, M. E.....R No. 2, Muncy
Sharples, Joshua.....London Grove
Stokes, W. P....219 Market st., Philadelphia
Sharples, J. C.....London Grove
Sharples, J. P.....London Grove
Sharples, Thos.....W. Chester
Sommers, R. M.....Phoenixville
Swartz, S.....Spring Forge
Snyder, A. H.....Kulpsville
Solt, W. A.....Petersville
Moyce, Titus K.....Blooming Glen
Mitchner, J. Walter.....Glen Hall
Martin, A. L.....(Dept. of Agr.) Harrisburg
Meloney, Geo.....1937 Market st., Philadelphia
Heller & Meez....55 Maiden Lane, N. Y. City
Meredith, W. A.....Corry
Martin, Eli M.....New Holland
Maxwell. E. Beverly.....Mechanics Grove
Moyce, C. F.....Millersburg
Miller, J. E.....Wallingford
Miller, J.....Stony Brook
Shook Bros.....Spring Mills
Schrack, J. H.....Wagontown
Smith, S. F.....Coudersport
Swope, E. S.....Campbelltown
Smith, S. H.....Muddy Creek Forks
Sieple, I. J.....York Springs
Saxton, H. W.....Granville Summit
Savage, E. A.....Southampton
Stilson, Geo. (Cry. Pkg. Mfg. Co.).....Chicago
Harper, C. E.....Enders
Harvey, J. F.....Russellville
Holderman, J. H.....Pottstown
Hamill. Robt..... Cochranville
Hall, Wm. A.....100 Broadway, New York
Howard, H. P.....Glen Mills
Harris, Mrs. S. J.....905 N. Broadway, Phila.
Harris, D. J.....905 N. Broadway, Phila.
Herr, J. Alders.....R. R. No. 4, Lancaster
Herr, Joel A.....Cedar Springs
Hay, J. Harris.....Bellefonte
Burnham, Beatrice..... Troy
Brant, Irvin S.....Reading
Sharples, Benj.....W. Chester
Thomas, J. P.....Cheney
Taylor, F. M.....Reedsville
Thompson, J. I.....Lemont
Taylor, G. K.....Grover
Thomas, F. G.....Cheyney
Torbin, W. H.....Gatchelville
Traver, T. E.....Wyebrook
Urffer, David.....Pottstown
Vrooman, M. J.....Ovid
Vandyke, O. D.....Leroy
Williamson, E. C.....Morrisville
Wells, Maj. Levi.....Spring Hill, Bradford Co.

Woodside, R. G.....Oxford
Weiland, Clyde.....Linden Hall
Waite, J. W.....Smith Port
Wales, A. L.....Corry
Wright, P. M.....E. Canton
Winey, A. L.....Thompsontown
Worthington, E.....Stone Church
Wells, F. S.....So. Montrose
Williams, Joseph G.....Oakburne
Walter, Edw.....W. Chester
Westcott, R. A.....Glen Roy
Willets, F. P.....Ward
Witler, Robert G.....Walkersville
Watson, Prof. G. C.....State College
Wallace, Mrs. Mary A.....Ellwood City
Young, D. C.....Smith Port
Young, A. P.....Wellsville
Yost & Son, I.....Myerstown
Besley, O. B.....Columbia Cross Roads
Baldwin, A. C.....Kanes
Baron de Hirsch.....Woodbine, N. J.
Buckwalter, J. Y.....Lancaster
Small, Allen B.....Pottstown
Snavely, H. H.....Lancaster
Snyder, W. R.....Enders
Colegrove, J. J.....Corry
Cloud, G. M.....Kennett Square
Conard, Dr. M. E.....West Grove
Casein Co. of America
Hanover Bank Building, N. Y.
Palmer, T.....Wallingford
Paschall, Joseph H.....Brandywine
Poyk, Max.....22 Clift st., New York
Pearson, Wm.....Calcium
Reichert, J. H.....Scranton
Nissly, John F.....Mechanicsburg
Hait, John D.....Bryn Mawr
Stokes, H. M.....Hanover
Gaber, E. L.....Lititz
McMaster, H. M.....Walkersville, Md.
Richardson, Wilson.....Berne
Riegel, Benjamin.....44 North 2nd st., Easton
Hull, D. W.....Waymart
Erk, George.....Seelyville
Ledyard, E. H.....Pleasant Mt.
Brubaker, J. F.....R. No. 7, Lebanon
Wagner, W. F.....Harrison City
Stevenson, W. E.....Burgettstown
Buchanan, J. S.....Hickory
Hamlinton, J. Wilson.....Meadville
Binkerton, G. W.....Allegheny
McJunkin, W. P.....R. 4, Unity
Arthur, J. S.....Meadow Lands
Hall, H. M., Jr.....208 Shady ave., Pittsburg
Schade, F. S.....Monaca
Dickson, D. S.....Bakerstown
Hartenbach, H. C.....Monaca
McKinney, J. W.....Monongahela, R. 1
Howeth, J. M.....Homer City
Poorbaugh, Nelson.....Mt. Pleasant
Holtzer, W. F.....Greensburg
Henderson, H. E.....Buenavista
Moon, H. C...Pittsburg, R. 2, Sharpsburg Sta.
Weber, W. F.....Pittsburg, Sharpsburg Sta.
Madenford, Penn.....Womelsdorf
Knight, F. H. H.....Leatherwood
Crooks, A. M.....Imperial
Van Norman, Prof. H. E.....State College
Wise, W. S.....Meadville
Kepple, J. B.....Greensburg
Lantz, J. F.....Glenmoore
Hargett, D. H.....Frederick, Md.
Lindley, H. A.....Washington
Shannon, R. F.....Pittsburg
Niederiter, A. W.....Marble

PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

Proceedings of the Seventh Annual Meeting

held at

THE MONONGAHELA HOUSE, PITTSBURGH, PA.

January 17 and 18, 1906.

Meeting called to order at 10.00 A. M. by the President, W. C. Norton, at the Monongahela House, January 18, 1906.

The Chairman: The first business will be the reading of the minutes.

The Secretary: The minutes have been published and distributed. All the copies which were printed, 2000, the past year have been distributed ,and I could use a great many more than I have.

The reading of the minutes was dispensed with.

The Chairman: We will now listen to the Treasurer's report.

Treasurer Lantz: I will not have a very lenghty report. I made out a detailed report last night, and I think I left it on my desk in my room. I am very glad I did. I think it would have taken up more time than necessary. The receipts have been four hundred and a few dollars and the expenditures a little over three hundred. The balance in the treasury to-day is $64.11. I want to say that the publication of our last annual report has only cost us $61 and some cents in cash. The job publishing company would have charged us about $240. Through the influence of the Secretary the National Stockman and Farmer has set up and done all the job work for nothing, and we have only had to pay for the outside work of the binding of the pamphlet, and in order to show our appreciation for this service, I move a vote of thanks be tendered Mr. Bayard for doing this great amount of work gratis. Motion seconded and unanimously carried.

REPORT OF COMMITTEE ON STATE FAIR

Chairman Norton: I would say last winter, in which I spent nearly the greater portion of my time in Harrisburg, it seemed to be a new matter to the representatives. They did not seem to understand. They had got the thing mixed with the old State Agricultural Society, and it was hard work to get it through their heads that we are not looking to the interests of the old State Agricultural Society, that we had no use for it, and that we wanted a new organization, and one that would be a success, which we could not secure by taking up the old organization. The old organization has got too much of a stink connected with it. Now, in going through the House and Senate last winter we found, Mr. Bayard and myself, that the representatives as soon as they understood the matter were willing to vote for a state fair. We had the bill prepared, as you all know, and while there was a very small amendment and some suggestions made to amend it in the House and Senate, there would not have been ten dissenting votes against the bill. But when we came to see the Governor (we went to see him two or three times) we could not get any satisfaction from him. Finally when he gave his decision, we found that he would veto the bill on account of the financial standing of the state. WhileI was in Harrisburg the other day the thought occurred to me that there wouldn't be quite as much fuss over the state deposits if we had a little of the money. We have a surplus of $12,000,000, and it was a flimsy excuse that there was no money. There was no changing the Governor. Even Senate Penrose himself tried to argue with him, but he could not do it. He had set his mind he wouldn't sign the bill, and that was the only reason he gave. He said it was a meritorious measure, and the people demanded it, but he couldn't see his way clear on account of the demand for the money for the hospitals and the insane asylums. Those were the two institutions that he seemed to base his argument on for not signing the bill. He could not get it through his head that they could support us with money for the state

sentatives said "We will put it through any way." When we came to study the matter over and look at it, we decided that it would be a hardship for the incoming governor to sign a vetoed bill; and we decided to drop the bill where it was. I have no idea but a state fair bill will go through in the next session. The trouble will be with the governor. There is no use getting a state fair commission appointed unless we can have a reasonable appropriation to start that fair with. There were some things occurred last winter I did not like. The old State Agricultural Society officers came to me and wanted to make an appointment, and because we wouldn't accept one of their number, making it binding on us to put one of that number on the commission, they then said they would defeat the bill. We told them to go ahead and do their worst if that was the spirit they were working for—their $2,000 a year. I do not think they can do us any hurt, but I do say I want nothing to do with the state fair that is going to take up the old Agricultural Society. We want a live State Fair Association. We are going to have it or we don't want any. If the breeders here say there should be a state fair committee appointed to go on and look after this legislation in the next session, we will do so, but there can be nothing done in the special session. But a year from now if this thing is managed rightly I don't see why we cannot get the law passed to go through the House and Senate, and the only question will lie with the Governor. I think the postal card system would not be a bad idea. It seems that that scandal connected with the old State Agricultural Society we have got to overcome. We have made up our minds not to have anything to do with it, and we don't want to be connected with it at all as an association. If we do we have got that to fight, and fight from the start. We intend to start clean. We want the united effort, we want the help of every one, not only the breeders, but the dairy people and any one interested in agriculture that is not a dairyman or breeder, and we want the manufacturers. If the manufacturers are with us and the railroads are with us, why the Governor could set himself up against the whole state I could not see myself when these men in Harrisburg were in favor of the bill. I have always felt we needed an appropriation so we could start out, or else there was no use in trying to organize a fair. You cannot organize a fair on hot air. It has got to have something behind it. We want your help, and we must have it. There is no strength in one man. It is the united effort of us all that will do the work.

The Chair: I appoint J. H. Reichert, Mr. Shoemaker and M. N. Clark an Auditing Committee.

Chairman Norton: The next will be a paper by Prof. Hills of Vermont.

ADDRESS OF PROF. J. L. HILLS

Feeding Animals.

Gentlemen: Yesterday afternoon I held in my hand a sort of blunderbuss with which I tried to sweep the whole horizon; to-day I have a rifle in my hand, and will address my talk at a single specific proposition—the feeding of animals. That is an old story to the farmer. Animals have been fed from the time of the flood. For several generations this matter has been discussed before farmer audiences. Why should it need re-discussion? For two or three reasons: In the first place, there are many who fail to comprehend the fundamental principles; and in the second place, because this, as every other thing has vexed human endeavor in this year of our Lord. I shall divide my talk into two parts. In fact, it will resemble somewhat a custard pie. There will be a sub-stratum, more or less undigestible; then it will have the superstructure of the custard which is much more digestible, and more palatable. So if those of you who do not care for the straight practicalities will go to sleep I will try to wake you up for the custard part of it.

Up to a comparatively few years ago the science of chemistry has been appealed to more particularly in this matter of stock feeding. We thought of protein and carbohydrates, we thought in terms of matter. Of late years another science, that of physics, has been brought into view, and we are discussing this matter to-day quite as much from the standpoint of energy, or force, as from the standpoint of matter. Now, to many people this second line of reasoning is not as clear as the first, and there are those who say, "We have learned what protein is, we have some conception of what carbo-hydrates are, why upset that? Why not lay your stress on those things, and why talk about energy? Why go into this matter from another standpoint? Let us lay emphasis on this thing we do know." There is some justice about that. On the other hand I believe it is well worth while to view these things from different standpoints. Take for instance, the cow. A man who is going to judge that animal does not look at her from the front only and observe her head, whether she has crumpled horns or not; doesn't observe her shape from there. He goes all around, front and rear, and views from every standpoint. In my judgment there is much to be gained by viewing this stock proposition from the dual standpoint of matter and of energy. Our animals, be they of the human or brute creation, are the most wonderful chemical engines devised. There is not one of these magnificent inventors of Pittsburgh or Philadelphia that will ever match the Creator in the matter of the making of an engine. The best of our steam and gasoline engines make use of a very small proportion of the total energy in the coal. You or I or our cows or our horses use a far larger proportion of the energy which we or they get in the form of food. Consider what a marvelous engine this is. It is self-feeding, self-stoking, and self-oiling, self-insulating and self-reproducing. It is a very different engine from any that has thus far been devised by man.

Now, look at this matter from the standpoint of energy and the standpoint of physics, in the long run, in my judgment, is to simplify these problems. It is not at present. Although it is my duty and pleasure both at the university to state these things and teach these things, I haven't begun to accomplish the things and get a clear conception viewed from the energy standpoint as I have from the chemical standpoint, but I believe that as the work goes on we shall see it in a clear light, and it will work out a simpler problem than has been worked out from the chemical standpoint.

Energy.

Last May there came to my desk Bulletin 71 of the Pennsylvania Station. I read it over with a great deal of interest, and threw my hands up and said, "Dr. Armsby comes nearer being an iconoclast in this matter of stock feeding than any man I have yet run across." He simply tipped over, to a large extent, a great many of the notions that we have hitherto been setting up. What was the general contention that he laid down there? I want to read it directly. That the value of certain feed stuffs was decidedly lower than had been computed according to the current methods of estimating the amounts of digestible nutrients present. And I said, "Wo is me." Here I and my associates have spent thousands of dollars in calculating these 1292 several experiments based on digestible nutrients.

He says further: "Coarse fodder in particular we found to have much lower values than the concentrated feeds, the relative values of the former as compared with the latter being greatly overestimated in the feed tables in common usage."

A few years ago the world was startled by what Madam Curie and her husband discovered with regard to radium and the radio-active bodies, but what has come from her work and that in many laboratories of the world is rapidly revolutionizing our ideas as to matter. I was taught in my college days about the atom. We feel less certain to-day about the atom than we used to feel. This class of work, the radio-active class of bodies, is changing our views. We don't know, to use the slang phrase, "where we are at." We are ultimately to come at a more sane and accurate measure of things. That is just being done, in my judgment, when we look at this matter from the standpoint of energy. To-day much is in a hullabaloo, not clear and not distinct, but we must unlearn apparently very many things, and learn other things that are more nearly correct. The man who never changes his mind (of course women do often) as new light comes to him is one of the most unsafe men to be the guide of other men. So I trust every man whose function it is upon the institute platform, or any platform, to teach this matter, or talk about this matter of stock feeding, will have an open mind and a receptive attitude as to these newer things, though they be at first uncertain.

However, this does not mean that we are to throw carbo-hydrates and protein into the Monongahela river. We are to still think of them in this transition stage, and I think for myself I shall use protein and carbo-hydrates. I am simply bringing this first substratum with a view to get into these minds this new light.

Composition of Feeds.

Now, in this matter of protein and carbo-hydrates we still must use them, we must still in this transition stage, I think, consider the chemical side of this proposition. We can't make milk without protein. Every thirty pounds of milk of average quality will carry about one pound of a modified protein in the casein and albuminous and kindred bodies. We must still look at that. And so for the remainder of my talk, which will deal with the more immediate practicalities, the custard, I want to direct your attention to these new materials as we find them in the roughages, the concentrates that are offered us for sale, or which are grown upon our farms. Protein, the flesh former—several other subsidiary functions, but primarily the flesh former. Casein, or curd maker; carbo-hydrates, with several subsidiary functions, but specifically the fat maker and the heat maker. Get those two close conceptions from the chemical standpoint—the flesh former ingredient, heat and fat producing ingredient. Now, in northern New England with our long, cold winters and our short summers, it is difficult for us on the farm to grow a sufficiency of protein flesh-forming, milk-making, milk-stimulating ingredients to make a sufficiency for our cows, and we needs must go into the market for purchase. For those people who can grow alfalfa, which was discussed so ably from this platform last evening, the proposition is a less serious one, but even though you do have alfalfa you must at times go into the market for the purchase of materials to supplement a food, and so it seems to me it is worth our while for the next fifteen minutes to consider advisably the economical purchases. Now the roughages for the dairy animal, it seems to me, are confined to three or four: hay, early cut, the more clover the better, or if you can grow alfalfa, better yet. A friend of mine in our state had been accustomed to say corn was king and clover was queen. And there was an irreverant cuss in his audience, who said, "What is jack and ten spot?" He could not answer. But alfalfa is the ace every trip, and I earnestly advise every one of you who have got lands that are at all adapted to that crop to try it at least in a small way the next year. One way that was advocated here last night seems to me to be nearer the key note in that line than any other. In all New England, in the last two years, we do not find a single permanent success with alfalfa, save in one limited locality, which is underlaid with limestone. Early cut hay, clover hay, alfalfa hay, those will give, however, more carbo-hydrates, more of the heat makers, relatively speaking, than it will of the milk makers and flesh makers. Corn I hold first of our feeding crops, corn in the silo—and I do say emphatically that in this year of our Lord no dairyman can afford to keep house or keep a farm without a silo on it. Lots of them say, "Why, with silage we hurt the milk." I have heard when the silage milk was eaten by the babes it was injurious to them. In Illinois they tried this matter and gave to over a hundred families a quart of milk, and asked those families to critically use that milk, and there were more who said the silage milk was better than gave the non-silage milk the preference. In fact I do not believe the modern silage hurts the milk.

Apple Pomace.

Some years ago Dr. Armsby's station put out a bulletin on the making of cider. I want to know how many of you can see, however, so far as your cows are concerned the residuum of that cider manufacture is an admirable thing, apple pomace. I am here reminded of a story of a judge in one of the New York courts who was trying a

negro woman for mistreating her son. He had her on the stand, and she was going over the harrowing details, how she lambasted the youngster, and the judge said, "Stop, madam, why did you treat this boy in such an outrageous fashion? I am shocked." She looked at him with fine scorn, and she says, "Look here jedge, were you ever the father of a worthless mulatto boy?" The judge naturally pretty nearly fell off the bench, but he collected himself and said that whatever his sins might have been that hadn't been one. "Well, then," she said, "if you wasn't you don't know nothing about the case." Now, there is a many a man when I first talked about this matter of using the apple pomace, who wouldn't take it. If you haven't tried it you don't know anything about the case. Apple pomace silage is good and does not hurt the milk or butter.

Concentrated Feeds.

Passing to the other side of this matter, in the matter of the concentrates, the Hon. Secretary of Agriculture last night told you something of what the state was endeavoring to do in the line of protecting the dairyman in the purchase of concentrated feeds for their cattle. He stated they have started some prosecutions along these lines. There is to be a conference next spring in New York city, I presume among the stations of the northeastern part of this country, as to what may be done in this matter of the food shortage in the protein contents of certain of the concentrates that are commonly sold through here. Our state laws in many of our states are nothing in this matter. But now while legislation may be and is of decided advantage in connection with this matter of stock feeding, it will not and cannot take the place of intelligent judgment of the individual. Legislation will throw about certain barriers, but it won't do your thinking for you. The station work and station publications are not to lessen but to increase your labors. As I frequently have said, investigation in agriculture is not a staff for farmers to lean upon, but a rod to stir them up with. It seems to me it is worth while for ten minutes to discuss this matter of the relationship of these concentrates to specific uses or their part in stock feeding. On every bag of concentrate sold in the state of Pennsylvania, barring a few specific brands, there must be a printed statement as to its composition in terms of protein and in terms of fat. Now, to the man who buys that bag in this fashion, the printing thereon will not amount to a row of beans. The man who buys with his eyes open, and looks at it, and cogitates about it, and fixes in his mind, the man of greatest observation, who studies the relationship between that statement and the price and the cow, will make far more and better purchases than he who simply buys upon the statement of the agent. I read two or three years ago in the Rural New Yorker a most enlightening article, written by my friend Masters of Connecticut. It was entitled, "The Confessions of a Feed Dealer." He told me nothing new, but I imagine it was new to a good many people. He said when he went into this feed business it was a side issue to another line of work he was in. He was actuated largely by altruistic motives. He thought he could do good to his fellow man and associates and friends by suggesting that this or that feed was the better. He thought he could help his people along that way. He told them cotton seed and linseed, although higher priced, were better values. He had great difficulty in selling them. They misconstrued his motives. To-day he has given it all up and sells what they demand, and sells them as well as the goods very often. Now, while the protein is not, in a slang phrase, the whole thing, still in the present inchoate state of our knowledge it is wise advice in my judgment to suggest that the dairyman fix his eye upon that guarantee, and when he has to buy for dairy stock to make that the main proposition. One cannot in fifteen minutes tell the whole story of this matter. It takes me a good many days in my class rooms. But that is the main proposition. That does not mean because cotton seed meal carries 43 per cent protein, the highest of any, that doesn't mean that is the sole and only thing to buy. It is too concentrated, too heavy. Second, the economical character of the food ought to be considered. Distillers grain and things of that kind, which are flaky and light to open up the ration, are better adapted to the feed than the bulky concentrate for the cow than are these heavy firm materials, like cotton seed and linseed. When I am talking about this matter I usually go out of my way to throw a boquet, as it were, to linseed meal, because though not so rich in protein as one or two other materials it is a great feed. It seems to me that the American public needs to be warned of one thing above everything else, and that is as to the true character of these proprietary mixtures known as the oats feeds. A little Jew boy was standing in front of his father's store one day, and he came in and he said, "Father, there is a lot of little birds out in front there saying cheep, cheep, cheep." He says, "Iky, go and get those birds and put them in the window so they may say cheep, cheep, cheep to people." That cheap, cheap, proposition to many of our ill informed dairymen is the main proposition.

An Economic Crime.

Our state pays three and one-half million dollars a year for purchase of foods from the West, and a million and a half of that sum is paid for corn meal. And yet the last census and the census of 1890 showed of the two states at the head of the states of the Union in the matter of the number of bushels of corn to the acre are New Hampshire and Vermont. Yet Vermont farmers send a million and a half dollars a year to Kansas to buy concentrated sunshine. Purchase of corn meal or the purchase of oats for the feeding of dairy cattle is an economic crime. The growing of corn and leaving it right up on the stalk, and the putting of the whole thing in the silo is a pre-eminently better way to treat that plant. They tell a little story of a man who went down into Boston one day and went into one of the cheap restaurants, and he called, among other things, for bread and cheese. The cheese was made from skim milk. He reached over to the butter, and he spread it on top of the cheese. And he said, "Come together here, you two, what poor fools have separated you?" Now, man plucks off the ear from the stalk where God placed it and puts it in the crib, and takes that ear and those of his fellows to the miller, and pays him a tenth toll to grind, and then takes it back again and places that corn meal, that stover, before the cow. That does not, so far as the cow is concerned, add one jot or one tittle to the digestibility of the

matter or to the energy, but the cow, as many an experiment station and many a practical feeder has found, the animal does poorer work on those two when they are divorced from each other than when they are put together. With all reverence let us repeat the marriage ceremony, "What God hath joined together, let no man put asunder." We fed two years with several of the different concentrates, and our cows told us the story. It is not what the chemist says. Hominy meal is rather better than corn meal for milk purposes, but at the prices at which it is ground in New England of late years it has not proved an economical concentrate to buy, as some of the richesr materials as a milk maker.

A Member: What are wheat screenings?

Mr. Hills: That is simply a nice technical term for weed seed. It may be fed to sheep but their digestive powers may be destroyed, and destroyed to quite a large extent.

A Member: Are the screenings ground?

Mr. Hills: I am not certain. A weed seed where every one is smashed is not going to do any harm. The danger in this matter that we cannot be sure those seed will not pass through the animal and sprout. If we can then there is no reason why digestible nutrients in every material should not be utilized.

The Cow a Balancer.

Speaking about a balanced ration. It does not seem to have entered into the conception of man very much that the cow is under a rigorous law to make a balanced ration herself in her milk making and eating for the feeding of another animal. She has to balance that ration. She cannot help herself, and the question of why you should feed protein and why you should feed this other feed as long as you can balance them rightly is governed by the fact of the work the cow has got to do herself. The Governor is entirely right, that in 30 pounds of milk the cow has got to put a pound of protein, and if you do not give her that protein to put in there, she will take it right out of herself or give you less milk. She is a fairly good cow of the purebred type, she is very likely to pour herself into that milk pail. I have heard it said the cow is like the Arkansas jury, find for themselves first and for you second. That balanced ration is not man's conception, it is made by the very animal herself. Another point about that balanced ration among dairymen. In former years that balanced ration was governed on a rigid rule, but the true balanced ration is made out of rubber instead of iron. What is good for one is not good for the other. These standards are not rules, but guides, not cast iron, but India rubber, and to be interpreted with intelligence and with judgment.

Gov. Hoard: When you strike thirty cows you strike 30 rigid rules. Each cow stands rigidly to her own rule. There was an old German who said: "The state pays me $4 a day for institute work. I don't know that I am making anything. The cows do better when I can breathe on those cows." I don't believe it was that man's breath, but it was his careful oversight of those animals. He knew every one of the animals, their needs and their desires and their ways as he knew his children. That is the successful man in dairying.

Mr. Reichert: Is it your idea the farmer should, in buying these concentrated feeds, be governed entirely by the price of protein contained? For instance it is said there are 860 pounds of protein in a ton of cottonseed meal which would make the protein costs 3½ cents a pound. Now, is that your idea? There might only be a dollar's worth of fat in the cotton seed. I might take another feed in which there would be $22 worth of protein in a ton and $4 worth of fat, and the total value of the feed would be more, counting the fact and protein, than the other that has only $24 worth of protein? Is it your idea when you buy concentrated feeds that would be safer to take into consideration simply the pound value of the protein in the feed?

Mr. Hills: Twenty years ago I bought for a certain lady a ring which contained a ruby and a diamond, which I am glad to say she still wears. Two years later I bought for her another circuit which was of gold, and which she still wears. Now, in that second purchased I paid for just one thing, gold. For the first purchase I paid for three things: I paid for gold, for the ruby and for the diamond. Now, in that first (chronologically engagement ring), how much did I pay for the ruby, how much for the gold? I paid just one lump price. You can't separate. And so in the case of cottonseed meal. There is no such thing as buying protein per se on the market by itself, or fat by itself or carbohydrates by itself. We can't in my judgment apply any commercial price safely to a digestible protein.

A Member: Is it worth while to make molasses to feed on the farm?

Mr. Hills: I think for certain stock feeding, particularly for working horses and things of that kind, the molasses has distinct merit. But whether it is worth while to make molasses on the farm I am not at all clear. We do not have it up our way. I should think for the horse it would be worth while; for the cows I am not clear.

A Member: Have you had any trouble, any cows failing to breed by feeding cottonseed meal?

Mr. Hills: I do not know that there is necessarily any relationship there.

Gov. Hoard: Is it your opinion that feeding has anything to do with the abortion?

Mr. Hills: I cannot conceive that it does.

President Norton: The next will be a paper entitled, "The Merino, Its Utility and Its Development," by John P. Ray, of Bloomfield, N. Y.

THE MERINO

John P. Ray, East Bloomfield, N. Y.

The subject of my remarks—the Merino—does not refer to any mushroom breed clamoring for public favor—the offspring of a night or of a score of years. The stretch away of many centuries is all her own. The facts surrounding the origin of Merino sheep are locked in the chambers of antiquity, and no man holds the key to unlock the mystery. This opens a wide field for speculation and romance. When Adam was appointed a committee of the whole to pass upon and name the kinds of animated nature the verdict was "very good."

Merino sheep more than any other conserve the comfort and well-being of man.

They know no North, no South, no East, no West. The world at large is their empire. Wherever vegetation grows and civilization obtains a lodgement, there they find a congenial home. They possess the inborn capability of being developed into any type that a country may need or fashion or taste of man dictate, and this is a great quality to possess. Their fleeces enter into fabrics for which there is no known substitute among textile fibers. Their sociability or love for companionship induced them to flock together. In length of days and years of usefulness they are the antediluvians among sheep. Were Noah's two rams an Infantado and Paular respectively? Tradition has it that these sheep trace from Spain through Italy and Tarentine into Asia Minor. Were Job's 14,000 sheep Merinos? The record makes no mention of their lack of herding quality. Merinos are the only kind that herds well. What other breed after being led into green pastures and by the side of still waters would lie down in serene repose beneath the shade of a cedar of Lebanon and inspire a man to write that immortal twenty-third Psalm—"The Lord is my Shepherd, I shall not want"?

I have known a lot of Merino breeders who were good whole-souled men to be trusted with gold uncounted. The shepherds on Judea's plain were deemed the fittest among men to witness the rising of the day-star of hope and hear the heavenly benediction "Peace on earth, good will to men." But why speculate? We know that they are the oldest breed of domestic animals and this is glory enough for you and me, my brother.

The richest legacy that has come down to us from the ancient Roman Empire is Merino sheep. Well did the haughty and proud Spaniard know the value of these sheep and what it meant to a nation to monopolize the breed and the fabrics made from their fleeces. Then were they the sought after by kings, the envied by princes. To be clad in Merino fabrics was a prouder distinction than to wear purple and fine linen. The Spanish nation was not true to herself or loyal to her brother man. Over against her record as a nation were written the words "Mene, mene, tekel upharsin." Her rule and sway was broken and her greatest good divided with others.

If deeds are measured by results, and institutions by the amount of human good, comfort and material well-being which they promote, then the bringing of the Spanish Merino to our shores by Humphreys, Jarvis, Crowninshield and others should place their names high on the scroll of fame as public benefactors. And scarcely less should we esteem the men like Jarvis, Atwood, Blakeslee, the Nettletons, Rich, Beedle, the Quakers of Lebanon, N. H., and Bailey and Potter of Rhode Island, who preserved the Spanish blood pure from its importation all through the vicissitudes which intervened from the beginning of the last century down to the decade of 1840-50, when they engaged the attention of master breeders like Hammond, Sanford, Robinson, Stickney, Elitharp and a few others who began the improvement carried on by their successors which has given to the world the marvelous American Merino, the greatest wool-producing animal the world has ever seen or will see, and established a blood line that can improve all other breeds in quality and amount of fleece. Possibly there may be a few flocks in the land of Merino extraction whose blood has not been mingled with this strain, but they are unknown to the speaker. The successful breeder employs methods and applies principles that may well be imitated by all sheepmen, both as to care and keep and judicious matings for result.

The Breeder.

This brings us down to the three heads under which we propose to discuss the subject in hand: The breeder, his material, and the principles governing his operations. Breeders may be classified as good, bad and indifferent. The good breeder has his ideal and no influence swerves him from his purpose. He shapes and moulds his animals as the potter does the clay, and establishes a blood line that can improve the breed or kind. The bad breeder is one that has no ideal, no fixed type in mind. He goes hither and yon and is swayed by every influence that crosses his pathway. He has everything in moderate type and nothing that stands for quality. The indifferent breeder is one who buys a strain of blood or distinction that he fancies will be popular. He has no knowledge of quality or blood line. With him a sheep is a sheep. He mates with no other purpose than to preserve the blood and breeds scalawags that are a stricture on their kind.

Now who is qualified to be a good breeder? Not everybody. Great breeders, like great artists and musicians, are to the calling born. By this we mean that they must possess natural traits and gifts that fit them for their mission. He must have an admiration for animals that nothing can abate, love their companionship, and be happy and patient while ministering to their wants and comfort. He must readily individualize and discern that every animal has a form and feature peculiarly its own, and grasp as by intuition that indefinable something known as quality. He must be an idealist and fix in his mind's eye the typical specimen, and have the creative genius to group his material and produce the specimen. Education and experience will give him ripeness for his calling and give expectations of better things farther on.

The Breed.

Having a call to the work the first move is to select the breed—not breeds; one is enough. In this he should be guided by individual taste, environment and prospective demand. Having settled this point get acquainted with the breed or kind. Study their history. Go up one side of the animal and down the other. Lay hold with a tight grip of the great essentials of constitutional vigor, size, form and fleece qualities and of what is of scarcely less importance—fancy points that give finish and attractiveness to the animal. Visit flocks of note and character. Ask a lot of questions, express very few opinions, and saw a lot of wood as the saying goes. Visit the fairs and watch the show ring and find out if possible the whys and wherefores of the judge's action, more especially if he is a noted and successful breeder of the kind. Such men are judges and their work educational. Do not buy until you have confidence in your own judgment to select, and begin to paddle your own canoe right from the start. Pin in your hat the motto that the best are none too good and the best are the cheapest. Better start with a few specimens and start right

than to start with more that you have to hoist into rank by years of breeding.

Strive to get the other fellow's great-producing ewe or ewes. Every flock has its mother queen. Several times we have purchased lots of ewes ranging from six to ten, and found that some one ewe in each lot was worth all the others as a blood line to improve or add to the standing of the flock in general. Seize and hold fast the old maxim that like begets like or the likeness of some ancestor as the law of transmission and inheritance, begetting like when the potency of like types in sire and dam overcomes the law of atavism, or striking back, and gives mould to offspring like some ancestor when this is reversed. Inscribe on your banner "The stock ram is my lever and he counts 60 per cent of my plant."

Some Experience.

It may show a lack of delicacy and do violence to the law of propriety to tear some leaves from a chapter of personal experience, but we are going to do it just the same. In 1881 we had two sons of Bismarck at the head of our flocks, one of our own breeding, the other purchased of Mr. Burwell. These were quite liberally patronized by outside breeders. Among them was Mr. Jas. R. Worthington, who bred five ewes to each ram. The conditions were that we were to choose a lamb from one ram's get, and decide in advance which ram's get we would draw from. Prince Bismarck was our favorite and of our own breeding, and we named him. In each bunch was a very choice ewe lamb. We liked the lamb got by Towando, the other ram, best and Mr. W. preferred the one we were entitled to take and an exchange was made. For two succeeding years he bred ten ewes to Prince Bismarck, we to have our choice of each crop of lambs. From the first crop we selected a ram lamb which we named Dudley, and that later proved a first prize winner at our State Fair. Our next selection proved to be a sister to Dudley, that won first and champion at our State Fair when six years of age. When preparing the pedigrees of these sheep for registration we found that the Towando ewe was out of his ewe Madam Dudley No. 21 and that the other two were out of No. 60 and she out of Madam Dudley, and that we had dipped deeply into his great-producing ewe family. Towando ewe 159, bred to Martin's Block, produced Don Dudley. Dudley is a connecting link in the chain of sires between Mr. Peck's young Bismarck ram, the only promising one known to the speaker, back to the great Bismarck. The Prince Bismarck ewe No. 195, bred to Prince Dudley, a grandson of Dudley and out of Don Dudley's dam, produced Rex Dudley, which proved a greater ewe sire than Don.

In 1899 on account of a severe illness we were obliged to sell our flock of sheep, that represented the work of nearly forty years, steady pull. When health came back to me again the love for the Merino came back also, and red-hot too, and when laying the foundation for flock No. 2 we were in possession of some facts that were valuable aids to us. We knew that all our improved American Merinos were descended in the male line from Sweepstakes, Comet and Eureka and that our most remote blood lines were more or less of kindred strains. So we sought divergent lines of a common type and type bred. We made our selections from Vermont, New York and Michigan flocks. From Mr. A. A. Wood we secured a ewe we sold him with our flock in '99. She was bred by Geo. N. Payne, Bridport, Vt., and got by Don Dudley. This ewe we considered the best ewe lamb we saw in Vermont that trip. My intimate friend of many years, Mr. T. J. Wynn, Lakeville, N. Y., had a ewe that was the highest scorer in the standard register; had clipped 25½ pounds and would weigh 152 pounds in full fleece. She was by Rex Dudley, dam by Kaiser, bred by us, and a son of Prince Bismarck, dam by Custer, a son of Bismarck. Kaiser was one of the best show rams bred at Pine Ridge. He beat the famous ram Jay Eye See at our State Fair. His full sister was the second dam of ram No. 179, J. P. Ray, known as Gold Bug, Jr., which has been held in such high esteem in Illinois and Ohio. This ewe we considered indispensable to our success, but buy her or trade for her we could not. We could only get her as a partnership ewe to breed on shares, each to own a half-interest in her progeny. We did not know of a single ram that met our ideal as a sire and show ram. Mr. Worthington, previously referred to, had a yearling ram of his own breeding, now known as Don's Champion. He was by Champion, son of Block, dam granddaughter of Don Dudley, and was a member of the Madam Dudley tribe. This ram was the most phenomenal specimen we ever saw on the score of massive folds and weight of fleece, clipping 43 lbs. 3 oz. in his three-year-old form, an even year's growth. He lacked somewhat in head, leg and style of fleece.

We recalled the facts that two removes from Bonaparte, another ram of this ilk, Mr. Burwell bred Bismack and Stub, and Mr. Crane Eureka 3d, and that from Fremont, Jr. Mr. J. T. Stickney bred Centennial and Stickney's 146, and that Kilpatrick, a large, coarse, heavy-boned masculine ram, was the corner-stone upon which L. P. Clark builded. This knowledge led us to desire an interest in Don's Champion, which we could secure only as a most generous gift from Mr. W. From this ram and the Wynn ewe was bred Bonanza, which Wynn & Bell won first and champion on at St. Louis in aged division, class A; and from the same ram and the Payne ewe was bred ewe No. 2, and from Bonanza and this same Payne ewe was bred Don's Rival, which won first and champion in yearling division and Grand Champion of all ages in class A, ewe No. 2 and Don's Rival winning ewe's progeny prize also.

Our apology for indulging at such length in recounting personal experience is the wide dispersal of the blood of Don Dudley and its world-wide popularity, and the great quality and show-ring form of others, and to emphasize the fact that the best breed the best, and the importance of the blood of great sires and producing dams in improving a race or breed.

The Dam.

While we place so high an estimate upon the blood of the producing dam we know of no feature of the breeding problem that demands closer scrutiny or wiser discrimination. Every observing breeder knows that among matrons that throw individuality in their produce there are two distinct classes, the positive and the passive; the positive possessing individuality by right of inherit-

ance and capable of enriching a blood line in volume and momentum; the passive perhaps lacking in both quality and breeding, serving simply as a channel through which the sire throws his type, yet unreliable as a breeding-on force. I cannot illustrate this point more forcibly than by taking two entire sons of the mighty Electioneer, which made the name of Leland Stanford famous the world over as a trotting horse breeder: Palo Alto and Chimes, the first-named with a trotting record of 2:12¼, and Chimes, that never could take a record of 2:30, unless he was capable of it in his two-year-old form. Palo Alto was a failure as a sire of speed. Chimes ranks great among great sires and is the greatest of his sire's get. Palo Alto's dam, Dame Winnie, was by Planet, a Thoroughbred. She could not trot, had no trotting inheritance and could not impart the trotting gait or trotting instinct. This she left to Electioneer. She may have given Palo Alto lung capacity, texture of bone, courage to speed fast. Chimes' dam, Beautiful Bells, was by The Moor, a Clay, second dam by Bald Chief, a Mambrino, 3d dam by Strader's Cassius M. Clay Jr., 4th dam by Abdallah, sire of Hambletonian, trotting-bred for generations.

In a prospective sire we want individuality and breeding in the two currents that compose his blood line—great sire and great dam. Don Dudley transmitted his own type to both rams and ewes; Rex and Kaiser that of their dams. Hubbards' Leader had objectionable characteristics that were not found in his sire, Jason—his dam had them. This ram got more spotted noses and black feet than any other ram I ever saw. The dam of Burwell's Hercules, son of Bismarck, had a straight, wiry fibre. This ram did much to destroy the beautiful highly-crimped and lustrous fleece imparted by Bismarck. I would not buy a ram without personal inspection and a thorough knowledge of sire and first and second dams, and as many more as could be reached.

In-Breeding.

Is in-and-in breeding a correct practice to follow? We answer yes and no. Safe with wise selection and a mighty lever for improvement carried down to the danger line, and a powerful engine for destruction carried beyond that point. Many are the one-time noted breeders who have plunged headlong into that pitfall. They became giddy over success and were too proud and narrow to recognize merit in other strains. They harped upon concentrated blood for potency, forgetting that type was the measure of individuality and that type depended upon type breeding. With how close relationship is mating admissible? Never with sire and daughter, mother and son, or full brother and sister. If conditions seemed to demand it I would mate half brother and sister where the dams of each were of remote blood, and the progeny of half brother by the same sire whose dams were remote from each other. This is a favorite cross with me. Some strains will bear more in-breeding than others. The Wilkes strain of trotting horses is conspicuous in this respect. To my mind the greatest danger that lies before American Merino breeders is the kindred blood of all our flocks.

Violent Crosses.

Are so-called violent crosses dangerous and unscientific? No. What are violent crosses? The mating of a fine-fleeced ewe with a strong-stapled ram, a small ewe with a large ram, a plain light-fleeced ewe with a wrinkly, dense, heavy-fleeced ram. Go beyond your ideal in a ram in the object sought for the first cross and to your ideal for subsequent crosses, and stay there. This is the cross-lot route to the goal.

Is uniformity in a flock the test of a breeder's skill and a measure of the value of his blood line? No, uniformity is but another name for mediocrity. The blood that improves a breed comes from the flock of the breeder whose motto is good, better, best. Never use a ram more than two seasons on the same ewes if it can be avoided. Who ever saw the third crop of lambs from same sire and dams that were equal to the first and second crops? If the nick is great use a good son and then go back to the old ram. Who ever saw a really great ram that had a full brother a year younger that was his equal? I never did. I killed a brother to Don Dudley for mutton (and it was as good a fate as he deserved), and sold a full brother to Kaiser for $2.50 to be slaughtered. Great are the mysteries of the breeding problem!

We have taken the American Merino as a special subject for discussion because he represents one of the highest achievements of the breeder's art, and because the family should be preserved as the fountain-head to be drawn from for fleece improvement, and because the principles involved in his successful breeding apply to all breeds and kinds of domestic animals. Many long centuries have intervened since One queried "How much better is a man than a sheep?" Then put the man behind the sheep and be true to your own manhood and to your brother man. Let your name stand for all that is moral, honest and upright, and let your methods and practices be an open book, read and known of all men. If he who makes two blades of grass to grow where one grew before is a public benefactor, how much more is he a benefactor who enhances the meat or wool-producing capacity of a breed. Verily he should rank among princes and not among mean men. "But," says one "are all these rules to be observed in successful sheep breeding, and are the principles laid down inviolable?" We answer yes, and more too. In these strenuous days of heroic endeavor, when success is measured by marvelous achievement, every detail that contributes to the end becomes an essential. I pity the man who has no ambition to stamp his name and impress upon something that will benefit his fellows. Such a one is a weakling and unworthy of true manhood and his generation.

The Future.

One word more and I am done. I believe as surely as the sun rises and sets in his course that the Merino is to come back and claim his own. For more than three-fourths of a century he was our national sheep. The forces that drove him from his birthright, free trade and shoddy, were unnatural, abhorrent and forbidding. For fleece production he stands out separate and alone. In hardiness he has no rival. As economical mothers of mutton lambs when mated with that object in view they challenge any and all breeds. I believe that a careful survey of world-wide conditions warrants the belief that a long period of prosperity lies before the American sheep farmers. So care for the sheep and kill the dog.

Gov. Hoard: You are proceeding on the line that the type you are after is on the male side?

Mr. Ray: Always, it cannot be otherwise.

Gov. Hoard: I wanted to know why you don't use the sire on the same female more than two seasons. That question of nicking is something clear back. I have got a Guernsey bull that nicks most splendidly with the majority of my herd, but I have six females that he don't nick with at all, and he didn't get me but one calf from those six cows, and that bull couldn't do his work with those cows right. I keep another bull, and I am trying to see whether they will nick with him. I can't find out in my course of breeding that this law you speak of applies.

Mr. Ray: I do not know that it does apply with cattle.

Gov. Hoard: I am interested to know if it applies anywhere.

A Member: Does a great ewe ever follow a great ram, both by the same sire?

Mr. Ray: In this case it seems to be an exceptional one.

Mr. Norton: Does the female throw herself through the sons and daughters or both?

Mr. Ray: I don't know, but all great men have great mothers. Isn't that so, Governor?

Gov. Hoard: That is what ails you and me.

Mr. Norton: In the Jersey family we have a cow that never produced anything in the female line worth keeping, but her sons were good.

Mr. Ray: That is often the case. We find it so with some sheep. They never produce a good ewe. There is a great difference in rams. There are mysteries in these breeding problems we have no information on.

Dr. Pearson: Kill the dog and save the sheep. I think that is one of the most important things we can consider with relation to the sheep interests. I propose our resolution committee draw up a resolution on this question of legislation concerning dogs, so we may be on guard regarding that important matter. Seconded and carried.

Recess until 2:10.

Meeting called to order by the Chairman at 2:10.

The Chairman: The first thing on the progrom is the report of the Auditing Committee.

"We have audited the accounts of the Pennsylvania Live Stock Breeders' Association, and find the receipts last year were $432.82; expenditures $366.71, leaving a balance in the hands of the treasurer of $64.11."

It was moved and seconded that the report be received and filed.

Resolved: That the Pennsylvania Live Stock Breeders' Association favor the inspection and licensing of stallions kept for stud use and the issuance of certificates showing their breed in the general manner that has been found so beneficial in Wisconsin.

Moved and seconded the resolution be adopted. Carried.

Resolved: That the Legislative Committee be instructed to make an investigation in regard to the dog laws of Pennsylvania, and to endeavor to secure the enactment of a law which will insure needed protection for sheep.

Moved and seconded it be adopted. Carried.

Resolved: That the Pennsylvania Live Stock Breeders' Association hereby endorse the bill H. R. 34, introduced into the house of Representatives by the Hon. H. C. Adams of Wisconsin to increase the national appropriation to the agricultural experiment station and request the representatives in the Senate and House to use their best efforts to secure its passage.

RESOLVED, That the Secretary be instructed to send a copy of these resolutions to the Hon. H. C. Adams, the Hon. James Wilson, Secretary of Agriculture and to each senator and representative from Pennsylvania.

Carried.

Report of Nominating Committee: The committee ,after taking this matter over have come to the conclusion it is not best to make any change in the officers for the following years. They present the following names for officers, directors and committees for the following year:

Names of Officers and Committees.

President, W. C. Norton, Aldenville; first vice-president, Dr. Leonard Pearson, Philadelphia; second vice-president, M. P. Shoemaker, Greensburg; secretary, E. S. Bayard, Pittsburg; treasurer, J. F. Lantz, Glenmore.

Executive Committee: W. G. Powell, Shadeland; M. N. Clark, Claridge; D. Norman App, Selinsgrove; William Berry, Washington; Geo. C. Watson, State College; James Blair, Hartstown.

Legislative Committee: Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Fallingston; R. L. Munce, Canonsburg; J. H. Reichert, Scranton; S. E. Nivin, Landenburg; Henry Palmer, Avondale.

Committee on Transportation: T. E. Orr, Beaver; Dr. J. Cheston Morris, Philadelphia; W. F. Shrum, Adamsburg; Jos. T. Fleming, Belleville; J. Grier Dain, Malvern.

Committee on Fairs: W. C. Blark, Mercer; Jas. Blair, Hartstown; J. L. Henderson, Washington; J. D. Detrich, Flourtown; L. D. May, Granville Center; W. E. Perham, Niagara.

It was moved and seconded that the report of the Committee on Nominations be accepted, and that the officers nominated be elected.

Unanimously carried.

President Norton: We must have the help of every one that is interested in the breeding interests of this state to accomplish our purpose. At any time we will be glad to have suggestions from any one interested in the live stock interests of the State of Pennsylvania. I will say this for myself, I will try to do my duty so far as I know how. At any time, as I said, that we can be of any service to you you certainly will be of service to us—we want you to let us know.

It was recommended that the following gentlemen be appointed to act as a State Fair Committee: Messrs. Norton, Pearson, Reichert, Shoemaker and Bayard.

Chairman Norton: We will now listen to a paper by Gov. Hoard.

ADDRESS OF GOV. HOARD.

Before starting in on my subject I have a number of sheets here which are the tables of the cow census taken in Ohio, which was published in Hoard's Dairyman last April, and I want to spend just a few minutes talking about this work. I have been taking these census and have spent now nearly three thousand dollars in taking them in different states in the Union, employing the most expert men that I can get. They have to be men of exceedingly good judgment in order to supplement the lack of knowledge and judgment which the farmer has. I take invariably the men who have furnished milk for one year at a creamery, in order that you can have the creamery back ground to fall back upon to determine the amount of cash and the amount of milk, and the census taker investigates the farmer, the number of cows, the way the man handles the cows, how he stables, etc. He goes to the creamery and gets the return in cash, and he divides the one by the other, and the quotient is irrevocable. Then they kick and declare it is not right. But then they are answered by saying, "Well, you furnished the facts; if you lied then there is no recourse. Now, this was evident to me, that there was a terrible waste going on because of a lack of knowledge all over the United States in dairy work. In 1886 I caused to be taken a cow census of the town of Ellisburg, New York, the second dairy town in the United States, containing 5,280 cows, 300 dairy farmers all at work in the cheese factories. Mr. Jenkins took the census at an expense of about $500, having the entire summer in hunting out the work of every individual cow, taking the amount of food that she consumed, pasturage at $9.00, and summing it up, and going to the cheese factory, and learning what she would earn, and then holding up the mirror to the patrons and the farmer to look at it, and brought the farmers of Ellisburg in debt $25,000. It seems the feed the cows had consumed would have sold at the local market for $25,000 more than the cheese factories returned. That created a great deal of consternation in the town of Ellisburg. In two years from that time he went and took another supplementary census and found there had been a remarkable revolution in the economic progress of those people. From that time to this that foolishness has died out in the town of Ellisburg. But it is all over the country. I have had about a hundred herds taken in Pennsylvania; fifty herds taken at Melrose; fifty herds taken out in another portions. This census was taken in Ohio, and here are various columns. The first is number of the patron. No man's name is given, but every patron can have his number if chooses. The number of cows, the estimated cost of the keeping, number of pounds of milk per cow, return from the creamery per cow, number of pounds of butter per cow, profit or loss per cow, received for $1 worth of feed, average price of milk per hundred. Now, the column that will interest you most is the profit and loss per cow. This reckons for every dollar's worth of feed. In that column of figures below $1.00 represents the loss—that is the difference between the figure and $1.00 is the loss. For instance No. 2 the return for $1 was 95 cents, and the loss was five cents. Another one 66 cents, loss 34 cents on every dollar, and so on. Now, you would be perfectly amazed at the lower economical skill and judgment of the men who are keeping cows, the number of men. Now, before I start my talk this afternoon, which is based partly on a lesson in cross breeding—I want to give you some calculations worked out from the recent cow census taken in Minnesota. I want this thought to underlie all you hear from me afterwards, taking it as a two foot rule in your pocket to measure things by. You know there is an old saying that every man gives of his own measure, that a man who carries a two-inch measure gives from that standard, another man a two-foot measure gives that much more. Every man comes to his task, every man comes to his cow, every man comes to his fellow man, every man comes everywhere by that power of measurement that he has established in his own mind. At the close of the Minnesota cow census which has just been finished in Hoard's Dairyman I divided the patrons into two classes :the readers and the non-readers. I became wonderfully impressed in my investigation and study with the fact that the power of every man over his own fortune in this business depends upon the attitude, the way he opens his mind, the manner with which he receives impressions.

Readers vs. Non-Readers.

The question of whether he reads or not. Out of the 100 patrons 63 are readers of agricultural papers and dairy papers or both, and 37 do not read. Now, let us see what that classification has to do with their fortune. The readers receive for each dollar's worth of food consumed by their cows $1.38, and the non-readers receive only 87 cents. The former class receive a profit of $10.00 per cow, and the latter a net loss of three dollars per cow. Think of a man struggling and struggling and working and working in that way. It is too bad, isn't it how the state of Minnesota suffers, how the community suffers, how the man suffers, and do you wonder that Christ said to Jerusalem, "How I would have gathered you as a hen gathereth her brood under her wing, but ye would not."

I was interested to know what the total return from the 100 herds there was by adding the amounts together. I found it to be $30,-280.00 and the cost of feeding $25,066. This made a net profit of $5,152. The question came to me: Supposing all the herds in the hundred were as good as the best, and there is no just reason why they should not be, what would the returns then be? In calculating upon this basis I found the returns would have been $57,244 instead of $30,-218. The cost of food would have been $28,-168 instead of $25,066, over $3,000 more, but a net profit would have resulted of $31,076 instead of $5,152. In like manner I took the poorest herd and here are the results. The total returns from the creamery would have $14,486 instead of $30,218. The cost of feeding $25,150, a little more than actual cost for the 100 herds reported. If all the herds had been like the poorest there would have been a net loss of $10,664. On the other hand if there had been a community which had 100 herds equal to the best the patrons would have marketed their grain at a profit of $31,056. Now, it is very hard to get the average farmer to see the tremendous effect that this economical talk has to do with him and his fortune. I do not know the reason why except that it is his head is submerged. I heard an old story of an Irishman going through a piece of woods in Wisconsin, and a man sunk in the quicksand. He rushed over to a Yankee house near by and he says, "Come over here, for the love of God, here's a man sunk in the mire." And the Yankee says, "How far is he in?" He says, "He is in up to his ankles." "Well, just let him get out. Wait until he gets up to his neck." "Yes," the Irishman says, "he is in the other end first." That is what is the matter—it makes a difference whether he is submerged head first or feet first in the morass. And if we could only get the average agricultural man to take time to think and read, to get time to stop, what would be the result? I don't suppose we will have time to ever do very much with the present generation of farmers. The only hope I have is the young men coming. If I can get the boys turned that way, get them to think, get them to take in these ideas in the common school, and get them to know what the terminology of agriculture means, so when they meet it in agricultural reading they will understand it, it will do more for the future of farming in the United States than all the colleges in the world. Now, you will say in the question of agricultural education I am reaching further. The boy that is to do the farming, that is to be. You say it is impracticable and a whole lot of theoretical schools. Let me give you one instance. I had a German farmer that has been to work for me for ten years at my home place. He takes care of my property there, and my horse and stuff. One day I was out on the farm and I had a piece of ground that was acting refractory and stubborn. I was puzzled with it, I says, "John, what is the matter with that land." I was surprised to hear coming out of that old German farmer's lips the words, "That land got no humus." I said, "John, what do you know about humus?" "Das learn in die schule." "What school, John?" "When I was a kind." And he went on to say that humus was decayed vegetable matter, that it served to hold the moisture in the soil, and he says, "Without the moisture the plant cannot grow," or as he says, "The plant drinks, it don't eat." That German farmer peasant had been better equipped in his childhood with the science of agriculture than 99 out of a hundred of American farmers to-day fifty years old. (Applause.) Now, who did that for that German farmer peasant boy? His government did it. His government had the practical understanding and ability to look away down to the roots of things, and see that the kinder school, the child's school, shall acquaint the child with the meaning of the terms. When I started in Hoard's Dairyman the feeding department questions and answers, I received thousands of letters from farmers all over the United States, what do you mean by the terms you use? What do you mean by protein, carbo-hydrates, nutritive ratios? These men were not without brains, these men were earnest thinking men, but their government, their state, had not done its duty by them. It had never taught them the meaning of the terms they were obliged to meet in agricultural study and reading, and of a necessity it was to them like a foreign language. There were no equivalents in these words I could find. I had to use the words, and so I put a glossary up there at the head of the department, a little dictionary explaining the meanings of all these terms that I had to use in agricultural chemistry. I got hundreds of letters thanking me for the information, for these things were made plain to them. That is one reason to-day why farmers do not read more; it is because their common school has not equipped them with the information that they are justly entitled to. It is not because they have not good brains. It is because the system of education throughout the United States is a wrong system. It is reaching for a higher education, but God knows there is no such thing as higher education. All facts and all knowledge are correlative, co-related. The words higher education is a misnomer. It has no business in your vocabulary or mine. The word to use would be a wider education, not higher. There is no altitude in education, it is width. So you see if a man occupied a foot of knowledge the thing for him to do is then to occupy another foot, and take in a wider range of judgment and understanding. Now, what effect has that had upon our country? From the Atlantic coast to the Rocky mountains the pathway of the agricultural farmer has been full of destitution and destruction. I can go into New York and Pennsylvania and Ohio to-day and find farms that I would have been obliged to pay $100 an acre in 1868, and I can buy them to-day for $30 and $40. What means that tremendous loss to the state? Lack of knowledge has cost New York in those years fifteen hundred millions of dollars in the decline of her farm values. Do you see what this means to the well being of a state?

Now, what I have to say to you this afternoon is on a line of "Some Things in Cross Breeding."

SOME THINGS IN CROSS-BREEDING

Underlying everything in cattle-breeding is the element of temperament. To define temperament, call it an inherited tendency of function. One class of cattle inherit a tendency toward motherhood in an enlarged degree; these we define as belonging to the milk and butter temperament. Another class inherit a tendency toward flesh-making; these we define as belonging to the beef temperament. As you develop the milking temperament, you decrease the flesh-making tendency and heredity and vice versa. It is so in horses as between the speed temperament and the draught temperament. For fifty years the Shorthorn cattle in this country have been bred steadily to establish the beef temperament. In all that time I have never heard of a Shorthorn sire which received a premium at a cattle show because of showing that he had inherited, or possessed the dairy form from which it might be supposed that he would beget cows of a dairy quality. So determined have been the Shorthorn breeders to extinguish all dairy qualities from their cattle, that they universally judge no sire to be of standard breeding that does not show in form and outline that he is of the most decided beef temperament.

Yet with all this strong determination to breed as far away from the dairy temperament as possible, our Shorthorn friends are continually talking of "Shorthorns from a milking strain."

This bold contradiction of all established principles in breeding has caused me to say what I have said for many years on this

subject. Is it consistent to steer North and claim we're going South? Is it consistent to breed sires absolutely for the transmission of the beef temperament, rejecting all that show any approach to the dairy form, and then claim that we are producing a "milking strain"?

The result of this inconsistent and illogical juggling with fixed principles of heredity is to the effect that the Shorthorn breeders have deceived themselves and have thus misled a great host of farmers throughout the land into buying beef bred sires with which to produce profitable dairy cows. These farmers wanted the best possible cow machine they could get. Dairy expense is too great to take up with any other with a hope of profit and economical production.

The organization of creameries and cheese factories all over the land makes it possible to look into this question, as well as many others, that effect the well-being of the dairy farmer. This has been done by the aid of the cow census. "Hoard's Dairyman" has been at this work for several years until its files contain a large number of these special investigations into the working of over twelve hundred herds, supplying milk to creameries for twelve months in the States of Vermont, Connecticut, New York, Pennsylvania, Ohio, Indiana, Iowa, Wisconsin and Minnesota.

In the States of New York, Ohio and Wisconsin, several of these census investigations numbering several hundred herds, in each State have been taken. The breeding of every herd, or rather cross-breeding, is given as well as the amount of milk, the butter-fat test, the final earnings per cow at the creamery and the amount of gain, or loss, for every dollar expended in feed. Also an inquiry is made as to the mental status of each farmer, his methods of management, his state of intelligence, what he reads and how he feeds his mind as well as his cattle.

From out this mass of testimony, which as yet has been but very slightly summarized, one would think at least that very valuable data could be obtained on which to build some judgment as to the pro and con of cross-breeding.

Take for instance the last cow census taken in Minnesota which has just been closed in the Dairyman, and see what it tells of this work of breeding and cross-breeding.

Results from Cross-bred Herds.

The one hundred herds enumerated contained an average of ten cows each, or a total of one thousand; of these, we make the following classification:

One herd pure Shorthorn; 38 herds grade Shorthorn; one herd of Jerseys; 9 herds of Jersey and Shorthorn cross-bred; 9 herds Holstein and Shorthorn cross-bred; 4 herds of Guernsey and Shorthorn cross-bred; 2 herds Brown Swiss and Shorthorn cross-bred; one herd Shorthorn and Rell Poll cross-bred; 2 herds of Shorthorn and Hereford cross-bred, and 20 herds of so-called "natives"; one herd classified as "mixed," which I have placed with the "natives," making 21 in this classification.

The records show in this practical creamery work that of the 38 herds of Shorthorn grades, 14 of them made a loss at the creamery ranging from 32c per cow to $10.51, or an average loss per cow of $3.79.

The remaining 24 herds of grade Shorthorns made a gain at the creamery, ranging from $1.70 to $24.18 per cow. The average profit per cow of the 24 herds was a fraction over $10.26. The pure-bred Shorthorn herd gave a loss of $5.20 per cow.

There was one herd of Jerseys numbering eleven cows which showed a profit of $19.72 per cow; 2 herds of Grade Jersey and Shorthorn cross that gave a loss respectively of $5.18 and $7.68 per cow. The seven remaining herds of this breeding, made a gain respectively of $2.61 to $30.63 per cow.

There were nine herds of the Holstein and Shorthorn cross. Of these, two made a loss, respectively, from 46c to $1.22 per cow. The remaining seven herds of this breeding made a gain, respectively, from $1.21 to $7.44 per cow.

The nicking of Holstein and Shorthorn, by these records, does not appear to be as successful as that of the Jersey and Shorthorn.

The four herds of Guernsey and Shorthorn show a loss in one herd of $6.84 per cow and a gain in the other three from $1.20 to $10.65.

The two herds of the Shorthorn and Brown Swiss cross, show a gain, respectively, of $1.80 and $2.05 per cow. This cross does not indicate a very strong dairy prepotency on the part of the Brown Swiss sire. There was but one herd of the Shorthorn and Red Poll cross. This herd made a gain of $19.41 which was very creditable indeed, but there were not enough herds of this breeding to give a comparison of tendencies or direction of temperament. The breeding on both sides of these families is strongly toward the beef temperament.

The two herds of Shorthorn and Hereford cross both gave a loss, one of 49c and the other of $2.16 per cow.

We come now to an interesting study of the universal cow of this country, so called the "native."

The twenty-one herds classed as "natives" gave results as follows: Ten herds showed a loss ranging from 83c to $6.61 per cow, or an average loss for the ten herds of $3 per cow.

The remaining 11 herds showed a gain ranging from $3.46 with the highest score in the one hundred herds, that of $37.85 per cow.

So far as we can learn this herd was constructed and brought to its present state of good profit by the owner being a good judge of cows in purchasing, and following that up by a most excellent understanding of how to care for and feed a cow after he got her. Of course added to this was the process of elimination, or weeding out of poor cows, which is one of the most important of all processes connected with the management of a dairy herd.

There does not appear to be any demonstration of breeding skill on the part of this owner, nor could there well be considering that he was dealing with a herd of native cattle, which derived their heredity from the hit-or-miss practice of the average farmer.

We can see, however, that this man would make a successful breeder should he attempt it, for he evidently has a large amount of what we might call "cow-sense" or understanding.

Temperament.

At the outset, I spoke of temperament in cattle. A number of years ago in reasoning on certain things that I found in my studies in cattle-breeding, I was obliged to give a name to this element of inherited tendency, which I called "temperament."

The breeder, if he thoroughly comprehends the scope of his purpose and work, is all the time striving to enlarge by skillful mating this element of temperament in every succeeding generation. If a dairy animal is bred, he wants it more and more developed in this direction through every successive mating. If a trotting horse or a draught horse is bred, the same principle will apply. Without this definite purpose of constant enlargement of the basic temperament, there can be no definite progress made in breeding.

Therefore, we are wise if we study the power and limitations of temperament. From it we will learn never to unite or mate two animals of opposing temperament or tendency. We must study as much as possible to enlarge the stream of temperament, not divide or dissipate it.

We must breed dairy temperament of an agreeing prepotency together as much as possible. For instance, the Holstein has a powerful prepotency towards a large quantity of milk with a small fat globule and a comparative low proportion of butter-fat. Those traits are as strongly inherited as are its color.

The Jersey and Guernsey families have just as strong an inherited tendency or prepotency towards a smaller quantity of milk flow with a much large fat globule and a larger per cent of butter-fat.

Is it a good exercise of breeding skill to attempt to unite in one animal such strong Ayrshire grade, the female comes so far this and widely dissimilar tendencies? Do they usually nick well, and to the purpose of making a better cow therefore? I think not.

With the Ayrshire cow and particulary the way from the rigid prepotent line as above indicated, as to very successfully nick with the Jersey or Guernsey. At least such has been the verdict of actual facts and experience in such breeding. If I were to arrange these forces that we are dealing with so constantly, and I may say many times so blindly, I would state them as follows: (1) Temperament, (2) Function, (3) Form.

We should breed primarily for temperament. Keep it as clear, unclouded and strong as possible. To that end, we must have a strong judgment of the prepotent power of the sire when we select him; on our wisdom in this particular depends almost everything that follows.

Temperament when acting free and unhampered by other opposing tendencies establishes function. Then function establishes form.

So in seeking to know temperament, whether it is of the kind we want, we reason back from form to function and finally to the bed-rock cause of all, which is temperament.

Constitution.

Now, I want to say a word or two on the question of constitution. That is one of the most important things for you to think about. The most reasonable theory for determining constitution I have ever seen is the structure of the abdomen. Men will tell you that wide between the legs, between the fore legs, deep belly, great lung capacity and heart capacity. There is good sound reasoning. A draft horse is a third wider between the fore legs than a race horse, and yet the draft horse would die if he were put to the same heart action that the race horse is, for in running a mile a race horse uses both lungs and heart to an extent that the draft horse would not do in six months. So I found in my study that the determination of constitution is the structure of the abdomen, the abdominal walls. The mother establishes in the foetus the fact of whether it is thoroughly and strongly nurtured or not. And it is through the umbilicus. It has been noted when a baby was born that when the umbilicus was thin and weak it was hard to raise that baby, but if short and thick and strong the channel of communication and nourishment between the mother and the child was full, that the child came into the world endowed with strong vigor, and that is the basis of constitution. Constitution in the dairy cow is not exposure to the cold, it is the ability to endure the exhaustive work of large milk production, to hold up under it. What is the meaning of constitution? The meaning of constitution in the race horse is ability to endure to the end of the race. The meaning in the draft horse is the ability to endure the heavy pulling. So that as in the old law of logic, in life never compare things that differ. Define constitution in every instance by the character of the function, and if it does not sustain itself within the function, then it is lacking in constitutional vigor. Breed for it. Always breed for it, but do not breed for one kind of constitution when you are needing another in the animal by a different function.

(In concluding Gov. Hoard gave on request of some veterans in the audience his famous description of Sheridan's ride.)

Profitable Cattle

—BY—

HON. B. O. COWAN

—OF—

American Shorthorn Breeders' Association

Vegetarianism has its earnest advocates who can adduce strong arguments to prove that mankind would live longer and be better if they were less carnivorous, yet despite these arguments the world will move on in the even tenor of its way and the great mass of mankind will continue to eat meat to the extent of their ability to procure it. I have no disposition to carry the discussion of this question farther than to say that the meat consuming nations of the earth have done most for the civilization and development of the world. Hence it may not have been altogether race and national pride which prompted William M. Thackeray to say, "This is the meat that I would eat were I to do battle with any mortal foe. Fancy a hundred thousand Englishmen after a meal of stalwart beef ribs, encountering a hundred thousand Frenchmen who had partaken of a trifling collation of soup, carrots, onions and Gruyere cheese." While mutton, pork and poultry will continue to be an important part of the meat supply of the world, beef is and ever will be the great staple. In relation to other edible meats, beef occupies much the same ratio as corn to other cereals. Hence, to a convention of earnest, investigating live stock breeders the question of the enlargement and improvement of the meat supply and an adequate and remunerative market for it, is of more vital interest than to speculate on the probable result of a contest between an army fed on prime beef and one filled with roots and cereals.

When one reads of the enormous receipts of live stock at our market centers, the impression is likely to result that the supply is out-stripping the demand. During 1905 nearly 17,000,000 cattle, sheep and hogs were received at the Union Stock Yards at Chicago, being an increase over the receipts of 1904 of more than 1,000,000 head. But while the increase in belief is held by many well-informed stockthe meat supply has been very large the men that the population of the world is increasing at a more rapid rate than its meat supply. It would be difficult to prove this theory by statistics in our own country alone, owing to the uncertainty and apparent inaccuracy of estimates of cattle prior to 1901, at which time a different and, we hope, more accurate system of taking the enumeration of cattle was inaugurated. In 1878 when our population was about 48,00,000, we had 30,-500,000 cattle, or about 630 cattle to each 1,000 of population. This number increased annually by one to three million head until 1892 when 54,067,590 were reported. From that time our stock of cattle decreased until 1900 when but 43,900,000 were enumerated. The estimate of 1901, under the new system of taking cattle census, shows an enormous increase, raising the number from 43,900,000 to 67,000,000. The increase of over 23,000,000 in one year gives ground for doubting the accuracy of former estimates. From 1902 the enumeration has shown no great change in the number of cattle, and in 1905 61,240,000 were reported. But whether this increased ratio of population over that of cattle can be proven in our own country, it can be easily established in the more densely populated countries of Europe, and while the meat supply is capable of immense expansion, the hungry mouths of the world's teeming millions are also rapidly increasing and are demanding food. But with any country that produces more than its own people can consume, the question of supreme importance is a foreign market, and the prices at which the surplus can be sold in a foreign market fixes, in a large measure, the value of the product put on the domestic market, and when the export demand is restricted or destroyed, loss and disaster are

sure to result. This axiom of trade cannot be too strongly emphasized. During past years the foreign demand has taken a considerable portion of our surplus products of grain and meats, but the certainty of having German and other European markets closed against us presents a crisis that should arouse the entire agricultural class of America. It is a condition, and a profoundly serious one, that confronts us. The German government has officially informed the United States that the agreement whereby we can export our products at the minimum tariff rate will cease March 1st unless a reduction be made in our tariff rates. In other words, Germany believes in reciprocity that reciprocates. While our trade with Germany has not been so large as with Great Britain, yet it has been considerable, and has absorbed a large portion of our surplus. We have been selling Germany, annually, about $200,000,000 of products, and have bought from her only $100,000,000. With a reasonable and just modification of our tariff rates, which can be made without detriment or loss to our own people, our trade with Germany and other Continentaal nations could be very largely increased. Because of decreased supply, beef and pork in Germany are selling at fabulous prices, while in the United States there is a surplus seeking market at very low prices. Speaking of this situation Hon. W. A. Harris, former Senator from Kansas, said, "Never was the time so opportune for effecting a commercial treaty with our German friends as the present. The situation in the empire is most critical, the country being involved in a meat famine, the proportions of which have astounded the whole world. Records show that in one year 12,000 horses were slaughtered in Berlin alone for food, and 79,000 were consumed in Prussia for the same year. These horses were not young animals, but old harness ridden beasts, in practically all cases discarded tramway horses." With trade restrictions, it seems the acme of folly to refuse to make a reasonable concession and so lose what trade we have. Senator Cullom, chairman of the Committee on Foreign Relations, in the House of Representatives, has publicly advocated the modification of our tariff rates so as to provide for a maximum and minimum tariff. He gives counsel which should be heeded by our Congress in considering this grave crisis. He says, "We must not go about this matter in the spirit of retaliation. Germany and other countries have the right to adjust their tariff systems to suit their own individual interests. We never have hesitated to exercise that right for ourselves. The tariff is necessarially a selfish affair. We should fix our duties in such a way as to further our own interests both at home and abroad. We want to build up American industries in America, but we cannot do that successfully unless we also build up American trade abroad. There is not the slightest prospect of the adoption of any arbitrary system of reciprocity or the successful negotiation and ratification of any general reciprocity treaties at the present time. If we are not in a position to give Germany or other countries some concessions in return for concessions we demand from them, we shall get the worst of the bargain. Germany can force us to pay maximum rates on goods we send into that country, but Germany will continue to pay our regular rates all the time. We have no weapon to compel her to give us the minimum rate."

The Pioneer Breed.

The topic, "Profitable Cattle," assigned me by your program gives field for wide discussion. The necessity of crop rotation to conserve the fertility of the soil was learned long ago by those who were wise enough to learn from experience, and that necessity has been strongly emphasized by our agricultural colleges. Coupled with crop rotation, is an agricultural axiom that has not been sufficiently understood by some grain growing sections of our country, viz., no system of agriculture can be permanently successful unless it is founded on the production of live stock. And while there are several breeds of both dairy and beef cattle that can justly lay claim to being profitable cattle, I shall, in this discussion, consider only the beef cattle.

The pioneer breed of beef cattle, and the one most widely distributed, is the Shorthorn. The breed had its origin during the 18th century, in the North of England, in the Counties of Durham, York, Lincoln and Northumberland—early known as North Umbria. They were known as Durhams, Teeswater cattle, from the river Tees, and Shorthorn as distinguished from the Longhorn cattle to which they were the more worthy successors. As the Anglo Saxon race is the blending of the best elements of several nationalities that successively ruled and plundered England for centuries, so the Shorthorn breed of cattle represents the commingling of the best bovine blood of the kingdom, which was intensified and improved by intelligent husbandmen, and soon became, and has continued to be the leading breed of the world. Some importations of these cattle were made to the American colonies during the latter part of the 18th century, but during the first half of the 19th century these importations became numerous, and many of these improved cattle found their way into New York, Pennsylvania, Virginia, and then to Kentucky, Ohio and on to the Mississippi Valley. As the fame of these excellent cattle spread ,the demand for them increased rapidly and consequently their value rose. As early as 1810 Chas. Colling sold 47 head at public sale for an average of $735 ,one bull selling for $5,000, and two cows at $2,000 each. Sales, both public and private, continued with varied success until they reached a climax during the decade from 1865 to 1875. In 1857 an importation was made into Illinois and sold at Springfield at an average of $1,165, and in 1875 J. H. Pickrell, former Secretary of the American Shorthorn Breeders' Association, sold 23 head at Decatur, Illinois, for an average of $1,265, and at this price Mr. Pickrell felt the bidders had robbed him. September 2nd, 1875, Mr. Torr sold 85 head in England at the remarkable average of $2,869, and four days later Lord Dunmore sold 39 head for an average of $3,829, and sold the bull, Duke of Connaught for 4,500 guineas, equal, at that time, to $26,900 American money. But the sensational sale of all bovine history was made at New York Mills, September 10, 1873, where the bidders lost their heads and afterward their money. At this sale 109 head sold for an average of $3,504, and one cow brought $40,600.

As the Shorthorns became scattered through the country they soon made a wonderful improvement on the native cattle. This improvement was greatest in Kentucky and Ohio, into both of which states several importations had been made from England. The farmers of these states soon produced

large number of excellent steers, that being matured and fattened then found a market in Baltimore, Philadelphia and New York, after an overland journey of 500 to 800 miles. The pioneers in this overland traffic were George and Felix Renick, of Ohio, the former taking 68 steers across in 1805, and the latter 100 head in 1817, which he sold in Philadelphia for $134 per head. In 1841 R. R. Seymour drove 840 fat steers to Philadelphia, and between these dates mentioned many droves were taken to seaboard markets. Owing to the condition of the country and the profusion of wild grasses it was possible for cattle to make this long journey and arrive in condition of prime beef, at least for that time. The long journey was made by big well-formed steers from 4 to 6 years old, lazily cropping the succulent grasses which grew in rich profusion everywhere, and slaking their thirst in the bubbling springs and clear fresh rivulets with which the country was abundantly supplied. The custom of the feeders and the condition of the markets of that day called for a far different class of beeves from what is required now. In 1855 Mr. B. F. Harris of Champaign, Illinois, sold on the Chicago market 100 grade Shorthorn steers that averaged 2,377 pounds and brought $7 per cwt.

Injury by Crazes.

During more than 60 years Shorthorn breeders had the American continent as a field of operation, untrammeled by fear of successful rivalry. And had they only pursued the conservative, helpful policy toward each other that has been observed in recent years, Shorthorns would to-day have fewer and less successful rivals. At the time when the importation of rival breeds was being started, many Shorthorn breeders were intensifying the blood of their herds to a dangerous degree by in-breeding and too close line breeding, and were depreciating many valuable herds by the creation and circulation of reports about objectionable and unfashionable crosses, and in some instances manifested more zeal in tearing down the herds of fellow breeders than in building up their own. During this period much bitterness between breeders was engendered and prejudices against several families of Shorthorns were started that have done incalculable harm to the breed. Tribes that had produced noted prize winners and most excellent sires were driven from positions of great popularity by objections which, in many cases, had no real foundation. The effect of this senseless crusade against so-called "unfashionable crosses" was to greatly restrict breeders in the selection of herd bulls, and some of the very best bulls of the breed were not used because of this prejudice. This was followed by a "color craze" during which no breeder dared to use a white bull in his herd, and very few had the courage to use roans. The prejudice sent many white and roan bulls of outstanding merit to the feed lots, and so restricted breeders in the choice of herd bulls. It was during this period when the Shorthorn breed was assailed from within by jealousies of its advocates, the color craze and unfashionable crosses, that it met the first organized opposition from without by the importation of rival breeds.

Owing to their early importation to this country, their wide distribution and great popularity, Shorthorns have moulded the character of the cattle of our country as no other breed has been able to do. And this splendid foundation, laid in thousands of graded herds, was built upon by the Herefords or Angus, and some of the cross-bred champions that have brought renown to rival breeds, would in an ultimate analysis, show considerable Shorthorn blood.

During the fat stock shows held some years ago, Shorthorn steers were champions in nearly all contests. During the International Shows for five years the champion steers have been from other breeds. This, however, must not be taken to indicate a retrograde in Shorthorns. At the shows of breeding stock, Shorthorns have grown stronger year by year, but very few breeders have given attention to the preparation and exhibition of steers, and particularly of the better class of steers. This work has been undertaken with judgment and great zeal by the other breeds, and success has crowned their efforts.

The Shorthorn's Claims.

The specific claim of superiority made for Shorthorns is that they come nearer answering every purpose of the farmer and stock grower than any other breed. They are surpassed by none in the produce of edible beef, while in the production of milk Shorthorn cows surpass all beef breeds. In scale they are generally conceded to lead their rivals, and in the Xmas issue of the Breeders' Gazette, Mr. John Clay stated that ranchmen who had been using Hereford bulls would be compelled to return to the use of Shorthorns to increase the size of their cattle.

Gentlemen, you have been entertained and entertained admirably by the speaker who preceded me, and who, according to his standard has forever put to sleep any claim that the Shorthorn breeder might make for her as a dual purpose animal. Now, I recognize this fact: that the specialist will succeed in his line. The physician who, after laying a broad foundation as a means of education takes a special course, specializes and prepares himself in some particular line of work will, of course, outstrip in that particular work men who are not specialists. We recognize the fact that the man who attempts to produce the highest type of beef animal, the highest type of dairy animal in the same animal will inevitably fail. That far I endorse what has been said, and endorse it most heartily. We accord to the dairy breed supremacy as dairy cattle, but we do not accord to the beef breeds supremacy in the ultimate test for the beef cattle; but while we accord to the dairy production of butter fat, I cannot and will not admit that it is absolutely impossible to have a dual purpose animal and to have a successful dual purpose animal. I want to say that a man cannot produce a beef animal that will go to our great contests and there meet the test of the opposing breed and win the prize if he attempts to have that cow give milk. It would be folly, and yet, as a matter of experience as a Shorthorn breeder and as a man who has produced winners in Shorthorn contests, I say it is possible to take an animal, the beef animal that is a remarkable milk producer, and take that animal and make it a winner in a beef contest. I have in my mind now a pair of Shorthorn heifers which I exhibited as calves and as yearlings all over the shows of the West and those

two heifers took first and second in every contest in which they entered. They were relegated to the breeding herd at two years of age, and were not shown. One of those was one of the finest milk producers ever in my herd, and while I patronize the creameries I say to the producers, and I say here, that Shorthorn cow when her calf was three weeks old produced from four to five gallons of milk per day more than that calf took. Is that not a dual purpose cow? Can you point to very many of your own dairy cows that send their butter-fat to the creamery who will equal the record of that cow?

Mr. Lantz: Did she keep it up after her calf was six months old?

Mr. Cowan: I took her to the state fairs and in contest with other cows won $370 for her milk production when her calf was six months old. That is milking at least successfully a good length of time. Now, don't understand me to claim the Shorthorn as a dairy cow any supremacy to the dairy breeds. I make no such claim, and the breeders make no such claim. But the Shorthorn breeders of this country do make the claim that they have a dual purpose animal and a successful dual purpose animal, one that in point of beef production is surpassed by none, and in the production of milk is a very creditable animal. I give due credit to all that has been said, but I protest, and I desire to protest with all the emphasis that is possible for me to put into words, to the statement that it was absolutely impossible and silly and fallacious to talk about an animal that is a successful dual purpose animal. Let me point you to-day to the dairy cattle of England, and from what breeds do they come? The dairy cattle of Great Britain to-day are taken largely from the Shorthorn breed, and you can go to the dairies of that country and successfully establish the fact that what I am claiming here is correct. I will admit what Gov. Hoard has said, that many Shorthorn breeders have bred out of their cattle the ability to make successful cows. In other words they have intensified the beef producing qualities of their cattle and at the expense of the dairy qualities. But in spite of all that, in spite of the fact that they have overbred as beef cattle, we have to-day numerous instances where we can point them out herds in this state and in New York that are making a very creditable exhibit as milk producing cows. Now, then, we want to be charitable. I give to other breeds every just claim that they can present in favor of their cattle. I want to say here, that the man who attempts to succeed by misrepresentation of his fellows in the race for life is not doing them justice. I do not, of course, refer to anything that has been said here to-day. I make that as a general statement: that we want to be generous to our rivals, we want to accord them just merit of the cattle they are defending.

THE MARKET HORSE

By Prof. Carl W. Gay, College of Agriculture, Ohio State University.

The first thing that presents itself to you, undoubtedly, is: Why a market horse? What is the difference between a market horse and a horse? Just that is the real keynote of what I have in mind. The difference between a market horse and a horse may be the difference between success and failure. That is the point I want to emphasize.

Now, what is a market horse? In the first place, commerce is an exchange of commodities. The market is the medium for the exchange of these commodities. In other words, the horse market is the medium of the exchange of horses. What determines this market? You say the producer on the one hand and the consumer on the other. It is the medium between the producer and the consumer. Which is the more important? The producer, of course, is concerned with the market, but the consumer is concerned to a greater extent. The market fluctuates with every wave of overproduction and under-production. Over-production is usually associated with a falling off in consumption. Under-production with an excessive consumption. Isn't it the consumer that is the determining factor to a greater degree than the producer? In other words, you take a horse to a man and say, "I will sell you this horse for $200." That horse is not sold, however, until the consumer—the other man—says: "I will give you $200 for your horse." He is the man who determines the market.

Now then, what is our market horse? It is the type determined by the consumer; the type for which there is a market demand. We have heard from the different speakers today, something about ideals. The market type will be our ideal. It is not sufficient, simply to possess an ideal; that ideal must be a correct one. If a man is breeding for fun he can follow his own ideals and notions and it is nobody's business but his own. However, that man cannot complain of the condition of the market. When a man is breeding for business he must conform his ideal to that of the people who are to take his product. He must study his market. So, the correct ideal for the horse producer is, the market type—that type determined by the demand. Perhaps a little discussion of this type will not be out of order. Take for instance the draft horse—usually considered the "farmer's horse." What is the market type demanded in the case of a draft horse of today? We do not need to go into details. There are certain things that are common to all draft horses; there are certain things common to all coach horses

and, in fact, certain things common to all horses. Every horse must have sloping pasterns and a good foot, a good eye and a good head; but there are certain things which determine the type—things by which you can discriminate between a coach horse and a draft horse; between a speed horse and a coach horse. The first thing to consider in the discussion of the draft type, the first thing your draft horse buyer will consider, is, weight. You ask the reason; what is the importance of weight? It has been figured out that a horse's value increases at the rate of 25 cents per pound for every pound that he weighs over 1,400. In other words, the difference between a 1,400 and an 1,800 pound horse, roughly, is $100. There is a good reason for this premium placed on weight. It is based on mechanical principles. Perhaps you do not know, but it is a fact, that when the locomotive first came into use there was a great deal of trouble in getting the wheels to advance the engine and not to slip. The idea of cogs and all such devices presented themselves as a solution to this problem. By accident one day, the load that was to be hauled in the cars was placed on the engine and it was found that where, heretofore, that engine had slipped the wheels and failed to advance with a load, when that load was placed on the engine there was no further trouble. So today our freight engines usually are heavier; not altogether because it takes more mechanism to furnish more power, but that their greater weight increases their efficiency. You take a draft horse on our city pavements and work him along side of a lighter horse—they may both take the same load ,but how do they accomplish the same end? The draft horse throws his weight into the collar; applies his power and walks away with the load. The light horse, with his courage, ambition and perhaps muscular power could start the load but for one thing; when he puts his weight into the collar and applies the power he does not move away with the load but is pulled to his knees; he has the strength but he cannot utilize it. You know of the old custom among stage-coach drivers in the East, where hills are so common—when heavily loaded and stuck on a hill the custom was for the driver to get out and ride the near horse or, if hauling mill stuff or the like, to put a few sacks on the horse's back; the weight thus taken from behind the horses and placed on their backs furnished them the necessary weight to hold them to their work, thereby accomplishing that which had been impossible before.

I had a little time with a buyer, yesterday, a representative of a large New York firm, and he would not look at a horse that weighed less than 1,600 pounds. His standard was a ton.

Horse Mechanism.

We cannot overlook this matter of weight. Before we go any farther let me emphasize the importance of regarding the horse as an animal mechanism. We do not mean by this to think of him simply as a machine, and abuse him as such, but to consider something of the mechanism involved. Take the electric car, by way of comparison; you have the wheels by which the car moves, the motor under the car which furnishes the power to move these wheels, and the controller on the head end of the car, in the hands of the motorman, by which the power to move the wheels is controlled and directed. In the case of the horse, we have a set of bony levers, represented by the limbs ,by which the horse moves; attached to these bones are a series of muscles constituting the power system by which these levers are operated. This muscular system, in turn, is under the control and direction of a nervous system; the nervous system ,if you choose, directed by the driver, and, the whole combination resulting in coordinate movement.

The second consideration in draft type, is, low setness. Buyers, as a rule, do not want a horse leggy, or, up in the air. It is true that an up-standing horse looks better before some of the big city vans and a buyer for that particular purpose will not emphasize the low setness; but, in a general way, a horse's weight and power are more effective as they are nearer the ground. We have ample demonstration of this fact on the gridiron; the men are continually coached to "play low," where their efforts are most efficient. In addition to this, by the law of correlation of parts, the horse which stands close to the ground is also broad, deep and compactly made; while the horse which is long on his legs is very apt to be narrow, shallow bodied, flat-ribbed, long and loose coupled. It is desirable to have him broad, deep and compact, for the reason that he derives his power from his muscular system, he must have a foundation—a bony skeleton—and the more breadth and depth there is to his skeleton, the greater the basis for muscular development. Compactness is an advantage in that it admits of the application of power to the best advantage. Power in the horse is resident in the hind quarters, but it is exerted against the collar; the more direct the application of this power—in other words the less distance between the hind quarter and the collar—the less is the loss of power. Then too, a short stick is more rigid than a long one. The compact horse will have a stronger back line through which to transmit this power than the horse that is more loosely made.

The one thing which means most in the description of a draft horse is, massive. If he is not massive he is not a draft horse. To what does this massiveness refer? Muscular development. If the horse is low set, broad and deep, he will have the muscular development which gives him massiveness.

This, in brief, then, is the draft horse type.

All structures, however, have a function, and we cannot leave a consideration of this draft horse structure without some reference to its function. The draft gait is a walk, and no one who knows his business will permit a draft horse to do anything else but walk at his work. In order that he may cover the most ground with the least effort to himself and in the shortest time, his stride must be long, straight, snappy and free.

To recapitulate, our ideal, which is the market type of draft horse, must first of all possess weight, then he must be low-set, broad, deep, compact and massive, and have a way of going that is especially serviceable for draft purposes.

A GREAT JOINT MEETING.

Beginning on Tuesday, January 22, 1907, Pennsylvania Farmers, Breeders and Dairymen will hold a great joint meeting at Harrisburg. The State Board of Agriculture will begin its regular session on Tuesday, the Live Stock Breeders' Association will begin its meeting on Wednesday and the Dairy Union will run its exhibit throughout the week, beginning its literary session on Thursday. The following special features will add interest to the occasion.

SHOW OF FRUITS AND VEGETABLES.

This will be held by the State Board of Agriculture. For particulars address Sec'y N. B. Critchfield, Harrisburg, Pa.

CORN AND ALFALFA.

The Pennsylvania Live Stock Breeders' Association will inaugurate a Corn and Alfalfa exhibition. Liberal prizes will be offered, and all are invited to compete for them, members or non-members. We especially urge members of the Associations here represented to compete. Particulars will be furnished later on application to Secretary E. S. Bayard, East End, Pittsburg.

DAIRY PRODUCTS AND MACHINERY.

The Pennsylvania Dairy Union will have a great exhibition of Dairy Products, Machinery, Appliances, etc. including a show of milking machines. Prizes will be offered for butter, cheese and milk. Apply to Secretary W. E. Perham, Niagara, for particulars.

Come out and help, everybody!

WHAT WE BREED

Pure Bred Stock Bred by Members of the Pennsylvania Live Stock Breeders' Association

HORSES.

ARABS.

Name.	Postoffice.	County.
Herman Hoopes	Westchester,	Chester

MORGANS.

A. R. Van Tassel.....DuBois, Clearfield
Geo. A. Hogg.....24th & R. R. Sts., Pittsburg
M. B. Stephens.....Dilltown, Indiana

CLEVELAND BAY.

Powell Bros.....Shadeland, Crawford

FRENCH COACH.

Powell Bros.....Shadeland, Crawford

CLYDESDALE.

Powell Bros.....Shadeland, Crawford

FRENCH DRAFT.

Powell Bros.....Shadeland, Crawford

SUFFOLK PUNCH.

Powell Bros.....Shadeland, Crawford

BELGIN DRAFT.

Powell Bros.....Shadeland, Crawford

STANDARD-BRED.

Benj. McKeehan.....Mt. Rock, Cumberland
W. C. Norton.....Waymart, Wayne
Homer Bros.....Greenville, Mercer
J. Blair (Carriage type).Hartstown, Crawford
Henry Palmer.....Avondale, Chester
W. A. McCoy & Sons.....Mercer, Mercer
Ezra Michener.....Michener, Bucks
Powell Bros.....Shadeland, Crawford
W. E. Stevenson..Burgettstown, Washington
J.M.Main & Sons.....Shippensburg, Cumberl'd

SHIRE.

Sam'l McCreary.....Volant, Lawrence
Wm. L. Christley.....Slippery Rock, Butler
Geo. A. Hogg....24th & R. R. Sts., Pittsburg
Powell Bros.....Shadeland, Crawford

PERCHERONS.

Wm. Thompson, Jr.....Lemont, Center
D. S. Kloss.....Tyrone, Blair
A. M. Dickson & Son...Cochranton, Crawford
E. B. Boyle.....Canonsburg, Washington
J. M. Main & Sons..Shippensburg, Cumberl'd
Geo. A. Hogg....24th & R. R. sts., Pittsburg
W. A. McCoy & Sons.....Mercer, Mercer
Powell Bros.....Shadeland, Crawford

THOROUGHBREDS.

R. S. Hartley.....Youngsville, Warren

HACKNEYS.

Geo. A. Hogg....24th & R. R. Sts., Pittsburg
Powell Bros.....Shadeland, Crawford

SHETLAND PONIES.

Wm. F. Gable.....Wyebrooke, Chester
W. M. Thompson.....Uniontown, Fayette
F. B. Stewart.....Espyville, Crawford
Powell Bros.....Shadeland, Crawford

CATTLE.

ABERDEEN-ANGUS.

W. H. Rink.....Johnstown, Cambria
W. L. Christley.....Slippery Rock, Butler
Jas. Blair.....Hartstown, Crawford
Bayard Bros.....Waynesburg, Greene
Penn'a State College.....State College, Center
Geo. Black.....Plumville, Indiana

AYRSHIRES.

Willis W. Hopkins.....Aldenville, Wayne
F. B. Stewart.....Espyville, Crawford

BROWN SWISS.

R. I. Young.....Middletown, Dauphin
W. H. H. Riddle.....Butler, Butler

DEVONS.

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A. S. Worden.....Frederick, Md.
J. Cheston Morris.....Westchester, Chester
Powell Bros.....Shadeland, Crawford

POLLED ALBIONS.

B. E. Ferris.....Hector, Potter

HEREFORDS.

J. I. Barley.....Baker's Summit, Bedford

HOLSTEINS.

W. T. Suter.....Riverside, Northumberland
Sam'l McCreary.....Volant, Lawrence
H. M. Lyon & Sons.....Wyalusing, Bradford
J. B. Henderson...Burgettstown, Washington
B. F. Jones.....South Montrose, Susq.
A. S. Worden.....Frederick, Md.
Geo. G. Paxton.....Houston, Washington
W. E. Stevenson..Burgettstown, Washington
D. S. Kloss.....Tyrone, Blair
J. M. Quivey & Sons...Houston, Washington
J. M. Paxton.....Houston, Washington
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T. M. McKee.....Lewistown, Mifflin
Penn'a State College.....State College, Center
J. E. Woodmansee.....Lake Como, Wayne
Nelson Poorbaugh.....Mt. Pleasant, Westm.
Wm. F. Gable.....Wyebrooke, Chester
R. S. Hartley.....Youngsville, Warren
Irwin F. McKee....Washington ,Washington
H. H. Snavely.....Willow Street, Lancaster
Wm. Thompson, Jr.....Lemont, Center
Geo. G. Paxton.....Houston, Washington
J. H. Peachy.....Belleville, Mifflin
W. H. Ridge.....Trevose, Bucks
H. C. Bughman...Greensburg, Westmoreland
R. F. Shannon.....907 Liberty st., Pittsburg
Henry Palmer.....Avondale, Chester
Ezra Michener.....Michener, Bucks
H. W. Comfort.....Fallsington, Bucks
R. S. Love.....Mt. Pleasant, Westmoreland

JERSEYS.

Jas. I. Thompson.....Lemont, Center
Chas. A. Porter.....Torresdale, Philadelphia
Ludwig S. Filbert...Fox Chase, Philadelphia
Geo. S. Barnhart..Greensburg, Westmoreland
R. I. Young.....Middletown, Dauphin
Geo. Erk.....Seelyville, Wayne
J. F. Lantz & Co.....Glenmoore, Chester
B. W. McKeehan.....Mt. Rock, Cumberland
A. L. Martin.....Harrisburg, Dauphin
Edward Walter.....West Chester, Chester
A. P. Warren.....Elizabeth, Allegheny
Jas. H. Cowan.....Duquesne, Allegheny
J. M. Main & Sons...Shippensburg, Cumberl'd
John B. Kepple....Greensburg, Westmorel'd
W. F. Shrum.....Adamsburg, Westmoreland
M. P. Shoemaker & Bro...Greensburg, West.
G. H. Knapp.....Aldenville, Wayne
L. W. Lighty.....East Berlin, Adams
R. S. Hartley.....Youngsville, Warren
J. I. Barley.....Baker's Summit, Bedford
W. E. & J. J. Perham.....Niagara, Wayne
W. C. Norton.....Waymart, Wayne
S. E. Nivin.....Landenburg, Chester
A. T. Replogle.....Waterside, Bedford
Austin Leonard & Son.....Troy, Bradford
W. F. Wagner....Harrison City, Westmorel'd
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Herman Hoopes.....Westchester, Chester
W. W. Harrison...119 N 11th st., Philadelphia
R. F. Shannon.....907 Liberty st., Pittsburg
Henry H. Randt.....Pipersville, Bucks
J. B. Wylie.....Washington, Washington
W. F. McSparran.....Furniss, Lancaster
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POLLED DURHAMS.

D. C. Andrews.....West Newton, Westm'd
Lee R. Scott.....Burgettstown, Washington
Chas. Buchanan.....Utica, Venango
J. C. Mattern & Sons....Hollidaysburg, Blair

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B. E. Ferris.....Hector, Potter
N. O. Brownlee.....Crothers, Washington
A. M. Dickson & Son...Cochranton, Crawford
D. Norman App.....Selinsgrove, Snyder

SHORTHORNS.

C. A. Hershey.....Gettysburg, Adams
W. M. Thompson.....Uniontown, Fayette
F. N. Hubbard.....Troy, Bradford
J. R. Truxal.....Greensburg, Westmoreland
John A. Cummins.....Waynesburg, Greene
Geo. G. Strosnider.....Waynesburg, Greene
G. D. Walker.....Salona, Clinton
J. L. Stouffer.....Southwest, Westmoreland
Jos. T. Fleming.....Belleville, Mifflin
W. J. Monroe.....Greensburg, Westmoreland
Ralph Minner & Sons.....Mercer, Mercer
W. C. Black.....Mercer, Mercer
B. L. Post's Sons....West Alexander, Wash.
A. S. Eagleson & Sons....Washington, Wash.
L. Douthett.....Thornhill, Allegheny
W. A. McCoy & Sons.....Mercer, Mercer
Lee R. Scott.....Burgettstown, Washington
Penn'a State College.....State College, Center
A. G. Shaffer.....Rural Valley, Armstrong
L. D. May.....Granville Center, Bradford
R. C. Vance.....Burgettstown, Washington
R. L. Munce.....Canonsburg, Washington

SWINE.

BERKSHIRES.

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George Black.....Plumville, Indiana
Penn'a State College.....State College, Center
A. S. Worden.....Ulysses, Potter
R. W. Crothers & Son...Taylorstown, Wash.
Geo. W. Mellotte.....Lisbon, Ohio
Edward Walter.....Westchester, Chester
J. M. Main & Sons..Shippensburg, Cumberl'd
Nelson Poorbaugh...Mt. Pleasant, Westm'd
Sam'l McCreary.....Volant, Lawrence
Jas. L. Henderson...Washington, Washington
L. W. Lighty.....East Berlin, Adams
A. H. Erdman.....Wiconisco, Dauphin
J. B. Henderson...Burgettstown, Washington
John A. Cummins.....Waynesburg, Greene
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Ralph Minner & Sons.....Mercer, Mercer
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H. C. Bughman...Greensburg, Westmoreland
R. F. Shannon.....Pittsburg, Allegheny
A. S. Eagleson & Sons...Washington, Wash.
N. O. Brownlee.....Crothers, Washington
S. V. McDowell.....Fredonia, Mercer
W. F. McSparran.....Furniss, Lancaster
R. S. Love.....Mt. Pleasant, Westmoreland
J. M. Paxton.....Houston, Washington

DUROC-JERSEYS.

Wm. Thompson, Jr.....Lemont, Chester
B. L. Post's Sons.....West Alexander, Wash.
George Black.....Plumville, Indiana
S. S. Blyholder.....Neale, Armstrong

ESSEX.

H. C. & M. R. Elder.....Darlington, Beaver

CHESTER WHITES.

J. A. Herr.....Mill Hall, Clinton
G. S. Barnhart....Greensburg, Westmoreland
J. Grier Dain.....Malvern, Chester
H. M. Lyon & Sons.....Wyalusing, Bradford
J. F. Lantz & Co.....Glenmoore, Chester
J. C. Mattern & Sons....Hollidaysburg, Blair
R. L. Munce.....Canonsburg, Washington
Edward Walter.....Westchester, Chester
A. P. Warren.....Elizabeth, Allegheny
J. E. Woodmansee.....Lake Como, Wayne
M. P. Shoemaker & Bro...Greensburg, West.
Benj. McKeehan.....Mt. Rock, Cumberland
W. F. Gable.....Wyebrooke, Chester
H. M. Lyon & Sons.....Wyalusing, Bradford
Willis W. Hopkins.....Aldenville, Wayne
J. R. Truxal.....Greensburg, Westmoreland
F. W. Levis.....Chadd's Ford, Chester
A. T. Replogle.....Waterside, Bedford
Jos. T. Fleming.....Belleville, Mifflin
W. J. Monroe.....Greensburg, Westmoreland
D. S. Kloss.....Tyrone, Blair
Henry H. Randt.....Pipersville, Bucks
W. A. McCoy & Sons.....Mercer, Mercer
A. M. Dickson & Son (O I C)
Cochranton, Crawford
J. Grier Dain.....Malvern, Chester

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J. C. Mattern & Sons.....Hollidaysburg, Blair
D. Norman App.....Selinsgrove, Snyder
A. G. Shaffer.....Rural Valley, Armstrong
A. P. Warren.....Elizabeth, Allegheny
Edward Walter.....Westchester, Chester
C. A. Hershey.....Gettysburg, Adams
W. F. Wagner..Harrison City, Westmoreland
J. L. Stouffer.....Southwest, Westmoreland
Burns & Adams.....Imperial, Allegheny
J. H. Peachey.....Belleville, Mifflin

TAMWORTHS.

R. S. Hartley.....Youngsville, Warren
Henry Palmer.....Avondale, Chester
M. P. Shoemaker & Bro., Greensburg, West.

VICTORIAS.

Jas. Blair.....Hartstown, Crawford

CHESHIRES.

Penn'a State College.....State College, Center

YORKSHIRES.

R. F. Shannon.....Edgeworth Sta., Allegheny
John B. Kepple...Greensburg, Westmoreland
F. B. Stewart.....Espyville, Crawford
H. C. Bughman...Greensburg, Westmoreland

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R. P. Berry.....Eighty-four, Washington
Wm. Berry.....Washington, Washington
R. L. Munce.....Canonsburg, Washington

DELAINE MERINOS.

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Lee R. Scott.....Burgettstown, Washington
E. B. Boyle.....Canonsburg, Washington

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Edward Walter.....Westchester, Chester
W. A. McCoy & Sons.....Mercer, Mercer
J. Grier Dain.....Malvern, Chester

DORSETS.

T. M. McKee.....Lewistown, Mifflin
A. S. Eagleson.....Washington, Washington
J. B. Henderson...Burgettstown, Washington
S. Shaffer.....Princeton, Lawrence
J. B. Wylie.....Washington, Washington
Henry Palmer.....Avondale, Chester

LINCOLNS.

Benj. McKeehan.....Mt. Rock, Cumberland
T. M. Shively.....Mifflinburg, Union
W. A. McCoy & Sons.....Mercer, Mercer

COTSWOLDS.

S. V. McDowell.....Fredonia, Mercer

HAMPSHIRES.

W. J. Monroe.....Greensburg, Westmoreland
Jas. Blair.....Hartstown, Crawford
Edward Walter.....Westchester, Chester

LEICESTERS.

W. A. McCoy & Sons.....Mercer, Mercer

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A. S. Worden.....Frederick, Md.

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J. F. Lantz & Co.....Glenmoore, Chester
Edward Walter.....Westchester, Chester
Wm. F. Gable.....Wyebrooke, Chester
C. A. Hershey.....Gettysburg, Adams
S. Shaffer.....Princeton, Lawrence
A. T. Replogle.....Waterside, Bedford
Jos. T. Fleming.....Belleville, Mifflin
Wm. Thompson, Jr.....Lemont, Center
Clarence M. Glasgow.....Calvin, Huntingdon
W. C. Black.....Mercer, Mercer
B. L. Post's Sons....West Alexander, Wash.
Herman Hoopes.....Westchester, Chester
D. S. Kloss.....Tyrone, Blair
J. C. Andrews.....Mattie, Bedford
John W. Burket.....Tyrone, Blair

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M. N. Clark (B).....Claridge, Westmoreland
Edward Walter.....Westchester, Chester
H. C. & M. R. Elder (B)...Darlington, Beaver
J. F. Lantz & Co.....Glenmoore, Chester
Penn'a State College.....State College, Center
A. P. Warren (B&Buff) Elizabeth, Allegheny
T. M. McKee (B).....Lewistown, Mifflin
D. N. App (B & W).....Selinsgrove, Snyder
Jas. H. Cowan.....Duquesne, Allegheny
Nelson Poorbaugh (Wh) Mt. Pleasant, West.
C. A. Hershey (B).....Gettysburg, Adams
M. P. Shoemaker & Bro. (W) Greensbg, West.
W. H. Gray (B).....Brookville, Jefferson
H. M. Lyon & Sons (B)..Wyalusing, Bradford

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J. R. Truxal (B)...Greensburg, Westmoreland
John A. Cummins (B)....Waynesburg, Greene
G. D. Walker.....Salona, Clinton
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W. F. Wagner (B)...Harrison City, Westm'd
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Jos. T. Fleming (Wh).....Belleville, Mifflin
Burns & Adams.....Imperial, Allegheny
Wm. Thompson, Jr. (B).....Lemont, Center
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J. Wolf Evans (Bf).....Spring Mills, Center
Herman Hoopes (B).....Westchester, Chester
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S. V. McDowell (B).....Fredonia, Mercer
Henry Palmer (Bf).....Avondale, Chester
J. C. Andrews (B).....Mattie, Bedford
W. A. McCoy & Sons (Wh)...Mercer, Mercer
Nelson Bros. (B).....Grove City, Mercer
J. Grier Dain (B).....Malvern, Chester
Penn'a State College (B) State College, Center
R. S. Love (W)...Mt. Pleasant, Westmorel'd
J. M. Paxton (Bf).....Houston, Washington

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Pa. State College (Bf)..State College, Center

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Pa. State College (PC)..State College, Center

ORPINGTONS.

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T. E. Orr.....Beaver, Beaver

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Pa. State College....State College, Center
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R. W. Crothers & Son (W) Taylorstown, Wash
A. G. Shaffer (Sil.)..Rural Valley, Armstrong
Wm. F. Gable (Bf).....Wyebrooke, Chester
C. A. Hershey (Wh).....Gettysburg, Adams
L. W. Lighty (Wh).....East Berlin, Adams
B. F. Jones (Wh).....South Montrose, Susq.
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W. F. Holtzer (Bf).Greensburg, Westmorel'd
B. L. Post's Sons (Wh) West Alexander, Wash
Homer Bros. (Bf).....Greenville, Mercer
H. C. Bughman (SL) Greensburg, Westm'd
D. S. Kloss (Wh).....Tyrone, Blair
Ezra Michener.....Michener, Bucks
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Nelson Poorbaugh (Wh).Mt. Pleasant, West.
M. P. Shoemaker & Bro. (Br) Gr'nsb'g, West.
W. H. Gray (Wh).....Brookville, Jefferson
L. W. Lighty (Wh).....East Berlin, Adams
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.....Allegheny

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W. H. Gray (Pekin).....Brookville, Jefferson
W. A. McCoy & Sons.....Mercer, Mercer

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B. F. Jones (Bl).....South Montrose, Susq.
J. R. Truxal (Br)..Greensburg, Westmorel'd
J. L. Stouffer (Br)..Southwest, Westmoreland
Clarence M. Glasgow (Br).Calvin, Huntingdon
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Benj. McKeehan.....Mt. Rock, Cumberland
M. P. Shoemaker & Bro..Greensburg, West.
W. H. Gray.....Brookville, Jefferson
H. M. Lyon & Sons.....Wyalusing, Bradford
R. S. Hartley.....Youngsville, Warren
J. I. Barley.....Baker's Summit, Bedford
J. R. Truxal.....Greensburg, Westmoreland
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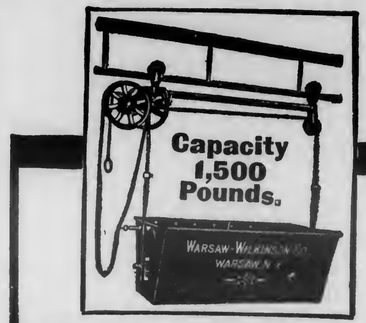

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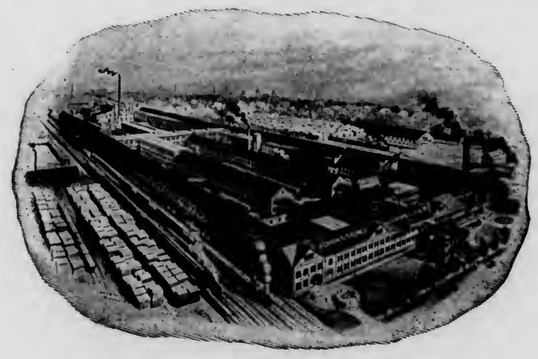

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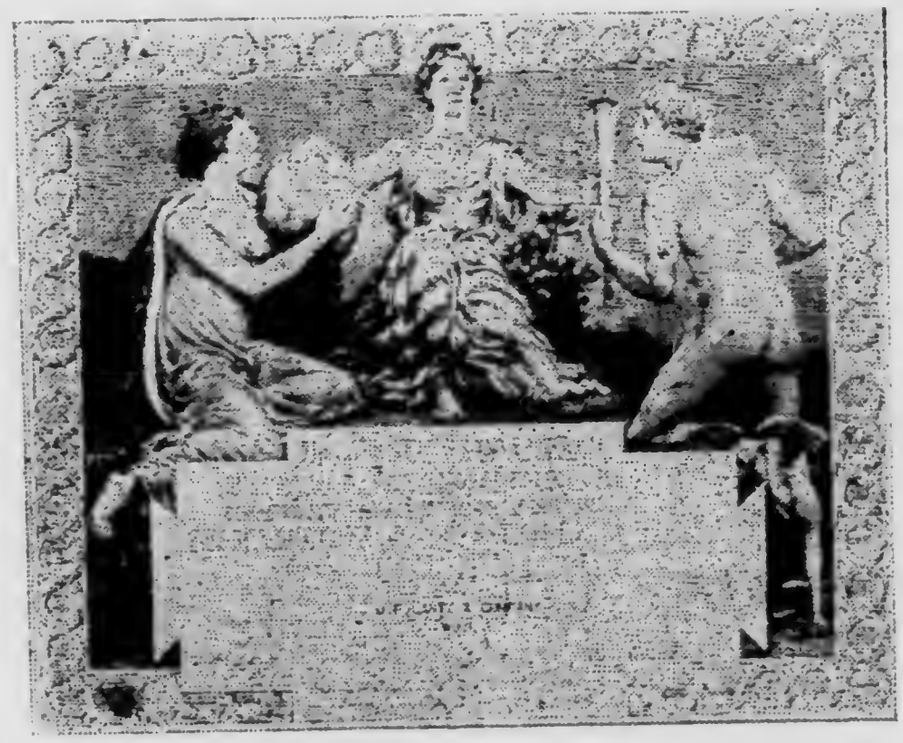

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